



United States
Department of
Agriculture

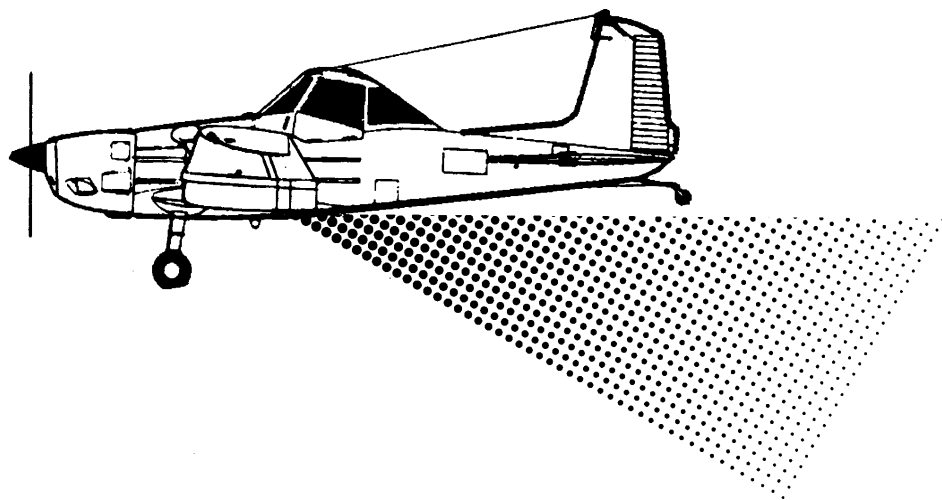
Marketing and
Regulatory
Programs

Animal and
Plant Health
Inspection
Service

Plant Protection
and Quarantine

APHIS Plant Health
Programs

Aerial Applications Manual



Update Record

Record the transmittal number and the date you received the update in the appropriate columns.

[illegible]

Table of Contents

Table of Contents

List of Tables

List of Figures

Introduction

page 1-1-1

Program Planning

Overview *page 2-1-1*

Size and Scope *page 2-2-1*

Information and Problems *page 2-3-1*

Environmental Documentation *page 2-4-1*

Program Maps *page 2-5-1*

Detailed Work Plan *page 2-6-1*

Aircraft Selection *page 2-7-1*

Essential Contract Information *page 2-8-1*

Personnel, Materials, and Equipment *page 2-9-1*

Memorandums of Understanding and Cooperative

Agreements *page 2-10-1*

Aircraft Operations Support *page 2-11-1*

Pesticides *page 2-12-1*

Pesticide Storage *page 2-13-1*

Environmental Monitoring *page 2-14-1*

Mortality Assessment *page 2-15-1*

Cholinesterase Testing *page 2-16-1*

Program Startup

Program Orientation *page 3-1-1*

Daily Log and Base Log *page 3-2-1*

Program Maps *page 3-3-1*

Equipment and Supplies *page 3-4-1*

Radio Communications *page 3-5-1*

Safety *page 3-6-1*

Briefings *page 3-7-1*

Treatment Area *page 3-8-1*

Support Agencies/Groups *page 3-9-1*

Calibration of Aerial Spray Systems *page 3-10-1*

Aircraft Guidance *page 3-11-1*

Pilot/Aircraft Inspection *page 3-12-1*

Worksite Organization and Inspection *page 3-13-1*

Program Supervision

- Operational Plan *page 4-1-1*
- Control Operations *page 4-2-1*
- Bran Bait/Aerial, Bran Bait/Ground *page 4-3-1*
- Contractor Actions *page 4-4-1*
- Daily Aircraft Record (PPQ Form 802) *page 4-5-1*
- Daily Briefing and Map Updates *page 4-6-1*
- Pesticide Supply *page 4-7-1*
- Pesticide Spills *page 4-8-1*
- Information Program *page 4-9-1*
- Complaints *page 4-10-1*
- Program Shutdown *page 4-11-1*

Appendix A

- Worksheet for Determining the Number of Aircraft Needed for a Program *page A-12-1*

Appendix B

- Chapter 7, Section 6, Cholinesterase Testing Program *page B-1-1*

Appendix C

- Pesticide Spill and Accident Contingency Plan and Emergency Contacts *page C-1-1*

Appendix D

- Ground Equipment *page D-1-1*

Appendix E

- Typical Aerial Application Treatment Project *page E-1-1*

Appendix F

- Guidelines for Responding to the News Media *page F-1-1*

Appendix G

- Aerial and Ground Bait Equipment and Information *page G-1-1*

Appendix H

- Manual Maintenance *page H-1-1*

Index

- page Index-1-1*

List of Tables

TABLE 2-7-1	: Aircraft by Category	page 2-7-2
TABLE 2-7-2	: Aircraft Performance for Category A Aircraft	page 2-7-4
TABLE 2-7-3	: Aircraft Performance for Category B Aircraft	page 2-7-4
TABLE 2-7-4	: Aircraft Performance for Category C Aircraft	page 2-7-5
TABLE 2-7-5	: Aircraft Performance for Category D Aircraft	page 2-7-5
TABLE 2-8-1	: Determine the Minimum Speed of the Observation Aircraft	page 2-8-2
TABLE 2-9-1	: Vehicles and Related Equipment	page 2-9-11
TABLE 2-9-2	: Radios	page 2-9-11
TABLE 2-9-3	: Weather Instruments	page 2-9-11
TABLE 2-9-4	: Pesticides	page 2-9-12
TABLE 2-9-5	: Dyecard Samplers	page 2-9-12
TABLE 2-9-6	: Maps	page 2-9-12
TABLE 2-9-7	: Flagging Material and Markers	page 2-9-12
TABLE 2-9-8	: Miscellaneous	page 2-9-12
TABLE 2-9-9	: Safety Equipment	page 2-9-13
TABLE 2-9-10	: Spill Kit at Pesticide Storage Area	page 2-9-13
TABLE 2-9-11	: Forms	page 2-9-14
TABLE 2-13-1	: Example of a construction aid to make the dike square	page 2-13-4
TABLE 2-15-1	: Determine the Minimum Number of Sites to Use for Mortality Assessment	page 2-15-1
TABLE 3-9-1	: Contacts Before Spraying Begins	page 3-9-1
TABLE 3-10-1	: Compare the Calculated Number of Nozzles	page 3-10-5
TABLE 3-10-2	: Flow Factor Table for Spraying Solutions Other Than Water	page 3-10-7
TABLE 3-13-1	: Items to Be Inspected	page 3-13-3
TABLE 4-2-1	: Determine the Length of Flight Lines	page 4-2-2
TABLE 4-4-1	: Pesticide Applicator Elements to Inspect or Monitor During Control Program	page 4-4-2
TABLE 4-4-2	: Airport Operation Elements to Inspect or Monitor During Control Program	page 4-4-2
TABLE 4-4-3	: Personnel Elements to Inspect or Monitor During Control Program	page 4-4-2

List of Tables:

[TABLE 4-4-4](#) : Aircraft and Equipment Elements to Inspect or Monitor During Control Program *page 4-4-3*

[TABLE 4-8-1](#) : Spill kit at Pesticide Storage Area: *page 4-8-3*

[TABLE 4-11-1](#) : Examples of information to record in Block 5: *page 4-11-3*

[TABLE 4-11-2](#) : Distribution of APHIS Form 329 *page 4-11-4*

List of Figures

- FIGURE 2-6-1: Sample of a Detailed Work Plan *page 2-6-5*
- FIGURE 2-6-2: Sample of a Work Checklist *page 2-6-6*
- FIGURE 2-8-1: Sample of a Description Data Sheet *page 2-8-5*
- FIGURE 3-4-1: Sample of an Application for the Commercial Credit (VISA) Card *page 3-4-4*
- FIGURE 3-6-1: Safety around fixed-wing aircraft *page 3-6-7*
- FIGURE 3-6-2: Safety around helicopters *page 3-6-8*
- FIGURE 3-12-1: Example of Certificate of Aircraft Registration *page 3-12-2*
- FIGURE 3-12-2: Example of Contractor's Pesticide License *page 3-12-3*
- FIGURE 3-12-3: Example of Operating Certificate *page 3-12-4*
- FIGURE 3-12-4: Example of a Maintenance Record *page 3-12-6*
- FIGURE 3-12-5: Example of an Aircraft Log *page 3-12-7*
- FIGURE 3-12-6: Example of a Certificate of Insurance *page 3-12-8*
- FIGURE 3-12-7: Example of a Special Airworthiness Certificate *page 3-12-9*
- FIGURE 3-12-8: Example of a pilot certificate *page 3-12-9*
- FIGURE 3-12-9: Sample of a Temporary Airman Certificate *page 3-12-10*
- FIGURE 3-12-10: Example of a Medical Certificate *page 3-12-11*
- FIGURE 3-12-11: Example of a flight review *page 3-12-12*
- FIGURE 3-12-12: Example of a State applicator license *page 3-12-13*
- FIGURE 3-12-13: Example of a pilot letter of competency *page 3-12-14*
- FIGURE 3-12-14: Example of an Aircraft and Pilot qualification Acceptance Report, PPQ Form 816 (front) *page 3-12-21*
- FIGURE 3-12-15: Example of an Aircraft and Pilot qualification Acceptance Report, PPQ Form 816 (back) *page 3-12-22*
- FIGURE 3-12-16: Example of a complete liquid system *page 3-12-23*
- FIGURE 4-1-1: Daily Operational Plan *page 4-1-2*
- FIGURE 4-2-1: Dyecard showing an acceptable deposition pattern of Malathion ULV concentrate at an 8.0 fluid ounce per acre rate *page 4-2-13*
- FIGURE 4-2-2: Dyecard showing typical deposition pattern with a leak in the spray system *page 4-2-14*
- FIGURE 4-2-3: Dyecard showing an acceptable deposition pattern for Sevin 4®-Oil at a 20.0 fluid ounces per acre rate *page 4-2-15*
- FIGURE 4-2-4: Dyecard showing typical deposition pattern for Sevin 4®-Oil at a 16.0 fluid ounces per acre rate *page 4-2-16*
- FIGURE 4-4-1: Example of an Aerial Contractor Performance Evaluation Report (PPQ Form 817) *page 4-4-4*
- FIGURE 4-5-1: Example of PPQ Form 802 (Daily Aircraft Record) *page 4-5-5*
- FIGURE 4-10-1: Example of a Record of Incident/Complaint *page 4-10-3*

List of Figures:

FIGURE 4-10-2: Example of a procedure for responding to complaints *page 4-10-4*

FIGURE 4-11-1: Example of a Contract Delivery Receipt (APHIS Form 329) *page 4-11-6*

1

Aerial Application
Manual

Introduction

Contents

Purpose [page 1-1-1](#)
Scope [page 1-1-1](#)
Users [page 1-1-2](#)
Related Documents [page 1-1-2](#)

Purpose

This manual will be useful to Contracting Officer's Representatives (COR's) and program managers to plan and conduct aerial applications that support domestic, emergency, and biological control programs. Users will follow information contained in this guide or tailor it to their individual program needs.

Scope

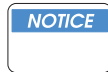
The content of the Aerial Application Manual (AAM) provides general approaches that apply to all [or most] domestic, emergency, and biological control programs. More specific methods and procedures are detailed in the specific pest program manual, new pest response guidelines, or biological control project manual. Topics that may vary from pest to pest are the type of approved pesticides, aircraft, handling pesticides, monitoring, and setup. Guidelines contained in this manual most likely will be compatible with new pesticide products that may become available to program managers unless the new product is not applied using current industry standards.

The AAM is a basic framework that describes general activities for conducting aerial treatment programs. Unfortunately, many activities take place simultaneously and not necessarily in the order they are presented in the AAM. Specific pest programs will have unique circumstances that must be planned for that may not be addressed in this manual. Professional judgement should supplement the general guidelines and models contained in the AAM.

The manual is broadly divided into tabbed sections:

- ◆ Introduction
- ◆ Preprogram Planning
- ◆ Program Startup

- ◆ Program Supervision
- ◆ Appendixes
- ◆ Index



Several sections that are frequently used and those involving safety have been marked with red tabs for quick reference.

The **Program Planning** section provides general guidelines from determining the size and scope of the problem to developing work plans and arranging for personnel and equipment.

The **Program Startup** section provides general guidelines for onsite tasks such as logs, maps, aircraft calibration, and aircraft guidance.

The **Program Supervision** section provides general guidelines on operational plans, contractor actions, and program shutdown.

The **Appendixes** contain equipment lists, technical information, and descriptions.

Not covered in the AAM is program specific information such as survey, pest biology, or procedures adequately covered in related documents.

Users

The AAM is used primarily by State plant health directors (SPHD's), program managers, and others who are responsible for preparing and/or conducting anticipated programs. The AAM will also be used by individuals who are designated as the COR responsible for administering the terms of contracts established to conduct programs, and for planning, supervising, and monitoring the associated control activities. Ideally, the person who will supervise the program should have a major role in the planning and organizational process.

Related Documents

The following documents relate to the AAM. Some provide direction, policy, and procedures to assess and analyze all potential impacts for anticipated programs. And, others provide additional reference to support individual programs.

- ◆ Gypsy Moth Program Manual

- ◆ Gypsy Moth Management in the U.S. - Final Environmental Impact Statement -1995
- ◆ Boll Weevil Eradication Program Guidelines
- ◆ Pink Bollworm Program Guidelines
- ◆ Grasshopper Program Manual
- ◆ Rangeland Grasshopper Cooperative Management Program - Final Environmental Impact Statement, 1995
- ◆ Hopper Decision Support Software
- ◆ Emergency Programs Manual
- ◆ APHIS Environmental Manual
- ◆ Pesticide User's Guide
- ◆ Pesticide Certification Training Materials
- ◆ Pesticide Labels and Material Safety Data Sheets (MSDS)
- ◆ Annual Prospectus for Aerial Application
- ◆ APHIS Manual 203, Safety and Health
- ◆ Collecting Environmental Monitoring Sampling (M390.1403)
- ◆ Guidelines for Managing Pesticide Spills (M390.1402)
- ◆ USDA Acquisition Handbook (Chapter 10, The Commercial Credit Card Program)
- ◆ Two-Way Radio Communication Operation Manual (807-58)

2

Aerial Application
Manual

Program Planning

Overview

The following categories are covered in this section:

- ◆ Determine Size and Scope of the Problem for Control Planning.
- ◆ Meet With Affected Groups to Gain Input, Exchange Information, and Identify Problems for Potential Programs.
- ◆ Prepare or Update Environmental Documentation.
- ◆ Apply Program Criteria, Identify Acreage to Be Treated, and Obtain Program Maps.
- ◆ Develop and Submit Detailed Work Plan (PPQ Form 136) and Other Documents.
- ◆ Develop and Submit Essential Contract Information.
- ◆ Determine and Arrange for Personnel, Materials, and Equipment.
- ◆ Develop Cooperative Agreements.
- ◆ Arrange for Support From Aircraft Operations.
- ◆ Order Pesticides.
- ◆ Arrange for Environmental Monitoring.
- ◆ Establish Mortality Assessment.
- ◆ Cholinesterase Testing.

2

Aerial Application
Manual

Program Planning

Size and Scope

Contents

Project Scope [page 2-2-1](#)
Assembling Program Information [page 2-2-1](#)

Project Scope

Determine the size and scope of the infestation to be treated by gathering information from pest survey results and forecasting models if available.

Determine whether there is landowner or land manager interest in treating the area and if the area is treatable from an environmental and logistical standpoint.

Information from historical data bases on population density trends are useful for determining trends and patterns.

Sources of information can be State and Federal cooperators, the extension service, and other interested parties such as ranchers and land managers.

Delimiting surveys should be conducted in the area to fine tune treatment block boundaries and supplement existing survey data.

Assembling Program Information

When determining the size and/or impact of a pest infestation, the following topics should be considered:

- ◆ Pest density when considering a program
- ◆ Size and location of infested area for preparing State and national infestation maps, and drafting maps of projected treatment areas
- ◆ Environmental concerns for updating documentation and drafting buffer zones
- ◆ Pest species identification when considering a program
- ◆ Predominant growth stage present for determining the timing of an appropriate control, if applicable

- ◆ Land ownership for determining program costs and cooperative involvement
- ◆ Type of vegetative cover for determining available standing forage and timing of an appropriate control, if applicable
- ◆ Weather conditions for determining potential, natural controls; prediction of dry or wet spring weather, or timing of an appropriate control, if applicable
- ◆ Cost benefit ratios of conducting programs when compared to no action
- ◆ Economic thresholds
- ◆ Proximity to cropland
- ◆ Environmental restrictions
- ◆ Can the block be aerially flown
- ◆ Potential aerial hazards

2

Aerial Application
Manual

Program Planning

Information and Problems

Contents

Meetings [page 2-3-1](#)

Notification of Beekeepers [page 2-3-2](#)

Meetings

Preprogram meetings are an important part of planning, decision making, and implementing control activities on private and public administered land. Meetings should be scheduled with private, State, and Federal cooperators to exchange information on the following topics:

- ◆ Management objectives
- ◆ Identify topics of concern to the project
- ◆ Locate sensitive environmental areas and issues
- ◆ Gain information needed to implement formal protection measures or informally develop site specific protection measures
- ◆ Determine availability of manpower and/or resources
- ◆ Other topics of local concern

Public involvement meetings may be mandated by individual pest program guidelines in order to comply with the National Environmental Policy Act (NEPA). The purpose of these meetings is to provide for public input on issues and concerns they may have regarding the proposed action. The public meetings also provide a forum where individuals can gain information regarding proposed actions and alternatives.

When organizing these meetings and identifying problems and solutions, local agricultural leadership such as extension agents should be involved. They know the people of the area, politicians, and past problems and/or solutions.

Meeting Attendees

People and groups that should be contacted or made aware of public meetings include:

- ◆ County and city government

- ◆ State and Federal representatives and appropriate regulatory agencies (Federal Aviation Administration (FAA), pesticide regulatory, etc.)
- ◆ School superintendents and principles (if schools are involved in the project area)
- ◆ Landowner groups (grower associations, grazing associations)
- ◆ Federal land user or recreation associations (i.e., trail riders, mountain bikers, hikers, 4x4 clubs, etc.)
- ◆ Federal land managers involved in the area
- ◆ Environmental organizations
- ◆ State and Federal wildlife management agencies
- ◆ Beekeepers

Other groups or agencies that may be appropriate to contact are listed in **Support Agencies/Groups** in the **Program Startup** section.

Activities conducted in regards to meeting with affected and interested groups should be coordinated with environmental documentation activities. Refer to **Environmental Documentation** in the **Program Planning** section.

Information on conducting public meetings and working with the media can be found in program manuals and guidelines and in **Information Program** in the **Program Supervision** section.

If no guidelines exist for your particular needs, refer to the Grasshopper Program Manual. The **Documentation and Decision Making** section contains a subsection titled **Prepare for and Conduct Public and Cooperator Meetings**. This subsection may serve as a framework that can be adapted to your specific needs and satisfy NEPA requirements.

Notification of Beekeepers

Many of the pesticides used in aerial treatments are highly toxic to bees. Program operational guidelines, environmental impact statements, environmental assessments, State laws, and/or pesticide labels may require that beekeepers in the area must be notified of control programs. General guidelines listed in the Grasshopper Program Manual in **Notify Involved Agencies, Groups, and Persons** may provide information that can be tailored to your specific needs.

2

Aerial Application
Manual

Program Planning

Environmental Documentation

Contents

Introduction [page 2-4-1](#)
Information and Guidance [page 2-4-2](#)

Introduction

Environmental documentation is a requirement of the compliance process for NEPA and the Endangered Species Act (ESA).

These acts in general terms are to ensure that any control alternative used will not jeopardize the survival of threatened or endangered species, or will not adversely modify or destroy the environment.

The environmental documents listed below provide the direction, policy, and procedure to assess and analyze all potential impacts for anticipated programs.

- ◆ National Environmental Policy Act (NEPA)
- ◆ Endangered Species Act (ESA)
- ◆ Final Environmental Impact Statement (FEIS)
- ◆ Biological Assessments and Biological Opinions
- ◆ Site-Specific Environmental Assessments (EA)
- ◆ Finding of No Significant Impact (FONSI)
- ◆ Record of Decision (ROD)

The documentation and processes are different for various programs. The Animal and Plant Health Inspection Service (APHIS) Environmental Manual, the Grasshopper Program Manual, and the Gypsy Moth Program Manual contain definitions, checklists, time lines, templates, suggested references, and other guidance material that will help in the preparation of these environmental documents.

Information and Guidance

Further information and guidance regarding environmental documentation can be obtained from:

USDA APHIS
Biotechnology Biologics and Environmental Protection (BBEP)
Environmental Evaluation and Documentation (EAD)
4700 River Road, Unit 149
Riverdale, MD 20737-1237
Phone: 301-734-8565
Fax: 301-734-8669

Consider having reference material placed in local libraries. Making information accessible may alleviate problems or concerns various groups and individuals may have. Materials would include:

- ◆ Environmental impact statements
- ◆ Environmental assessments
- ◆ Pesticide labels and material safety data sheet (MSDS) information
- ◆ Program objectives
- ◆ Program background information

Activities in this section should be coordinated with information contained in **Information and Problems** in the **Program Planning** section.

2

Aerial Application
Manual

Program Planning

Program Maps

Contents

Introduction	page-2-5-1
Criteria for Selecting Program Maps	page-2-5-1
Map Scales Commonly Used	page-2-5-1
Minute Series Commonly Used	page-2-5-2
Geographical Information Systems (GIS) Maps	page-2-5-2
Information to Record on Master Maps	page-2-5-2
Land Ownership	page-2-5-2
Treatment Boundaries	page-2-5-3
Sensitive Areas	page-2-5-3
Special Use Airspace Areas	page-2-5-4
Hazard Areas	page-2-5-4
Update Notes	page-2-5-4
Map Legend	page-2-5-5
Distributing Maps	page-2-5-5
Updating Program Maps	page-2-5-6

Introduction

Maps are possibly the most used tool when conducting a program. Good quality maps are essential to a successful project. Accurate and up-to-date information will alleviate many potential problems COR's and program managers routinely face.

Criteria for Selecting Program Maps

In general, the size of the project will determine the scale of the map to use. Topographic maps, surface management maps, and other maps with similar detail are excellent maps for smaller blocks. Large area treatments will probably require appropriate map scales to make the map easier to handle. Several types and scales of maps may be useful for the same project. Seven and one-half (7.5) minute maps provide excellent detail and information necessary for master program maps but would be impractical for an aircraft cockpit where a different scale would be more convenient.

Map Scales Commonly Used

Map scales are listed from smaller size blocks to larger size blocks. Program managers and COR's will pick a map scale that is a compromise between the amount of detail required and convenience of use:

- ◆ 2-5/8 inch to the mile (1:24,000)
- ◆ 1 inch to the mile (1:62,500)
- ◆ 5/8 inch to the mile (1:100,000)
- ◆ 1/2 inch to the mile (1:125,000)
- ◆ 1/4 inch or less (State highway type maps)

Minute Series Commonly Used

- ◆ 30 minute
- ◆ 15 minute
- ◆ 7.5 minute

Geographical Information Systems (GIS) Maps

Work units with this mapping capability have an advantage over those using traditional methods. Program managers can produce maps at any desired scale or zoom in on a particular section of the treatment area. Various data layers can also be added or omitted from the program map. Depending on availability for a particular area, data layers include county boundaries, ownership, land use, roads, and waterways. Other data layers that have been developed in some States are threatened or endangered species locations.

This technology has been interfaced with Global Positioning System's (GPS) aircraft guidance. Refer to **Aircraft Guidance** in the **Program Startup** section. These systems can provide accurate records of aircraft flights, treated or nontreated areas, and other necessary program documentation.

Information to Record on Master Maps

Determine the information to record on a program map by working with cooperators and experienced surveyors. Some standard information to identify in the treatment area is listed in this subsection.

Land Ownership

Within the treatment block, determine and identify on the map the following landowners:

- ◆ Federal
- ◆ State
- ◆ Private-rangeland, cropland, associated idle land
- ◆ Trust or tribal lands

Treatment Boundaries

Use landmarks to mark the boundaries of the treatment area, especially for aerial applications. If no landmarks occur at the boundaries of the treatment area, indicate the flagged corners of the area. Examples of landmarks are as follows.

- ◆ Brush patches
- ◆ Buildings (windmills, sheds, barns)
- ◆ Fence lines
- ◆ Fixed objects (fire breaks, pipelines)
- ◆ Standpipes
- ◆ Highways
- ◆ Railroads
- ◆ Ridges, mountains, mesas, hills, and buttes
- ◆ Rivers
- ◆ Roads
- ◆ Telephone and power lines
- ◆ Trees

Sensitive Areas

Request information about existing sensitive or restricted areas from cooperators: State cooperators, ranchers, Federal landowners. Include the buffer zone around the following sites:

- ◆ Unregistered crops or animals (lactating dairy cows)
- ◆ Beehive locations and negotiated bee buffers
- ◆ Poultry farms
- ◆ Endangered and sensitive species buffers as negotiated with Federal, State fish and wildlife agencies, and land managers
- ◆ Populated areas, such as, towns, villages, housing developments, colonies
- ◆ Private property **not** involved in the control program
- ◆ Religious tribal areas
- ◆ Schools, parks, and recreational areas
- ◆ Bodies of water (e.g., lakes, ponds, small streams, rivers)
- ◆ Wetlands
- ◆ Organically grown crops
- ◆ Areas identified by informal, field level consultation

- ◆ Biological control release sites, insectary sites, experimental sites
- ◆ Prearranged emergency dump sites
- ◆ Military areas
- ◆ Prohibited areas
- ◆ Warning areas
- ◆ Restricted areas
- ◆ Military training routes and areas

Special Use Airspace Areas

Special use airspace confines certain flight activities and restricts entry, or cautions other aircraft operating within specific boundaries. These areas are depicted on visual aeronautical charts and include prohibited areas, restricted areas, military operating areas, and military training routes. Contact Aircraft and Equipment Operations (AEO), Aircraft section, for information and assistance during program planning.

Hazard Areas

The following listed areas are hazardous for aerial application when they are within or near the treatment area:

- ◆ Bridges
- ◆ Mountains
- ◆ Canyons, bluffs, or cliffs
- ◆ Nearby airports
- ◆ Tall buildings
- ◆ Telephone poles/power lines
- ◆ Towers (elective, microwave, radio, etc.)
- ◆ Windmills

Update Notes

Changes or updates to the following items should be documented in the daily log:

- ◆ Changes in treatment block boundaries
- ◆ Boundaries of completed treatment block
- ◆ Dates and areas completed each day
- ◆ Number of acres treated
- ◆ Number of gallons used
- ◆ Complaints

- ◆ Other events (accidents, drift, etc.)

Map Legend

Identify the following items on the treatment map:

- ◆ State and county boundaries
- ◆ Contract number
- ◆ Contractor
- ◆ Date started and finished
- ◆ Total acres treated (at completion)
- ◆ Total gallons sprayed

Distributing Maps

Provide a draft, master program map to cooperators: chairperson of a rancher committee, Federal and private, State cooperator, fire/police departments, and airport manager. Have the cooperators review it for accuracy of the drafted treatment boundaries. If corrections are received from the cooperators, make the necessary adjustments.



Verify With the Pilot(s) the Spray Block, Sensitive Areas, and Buffer Zones

After taking a pretreatment reconnaissance flight with the pilots, and confirming that everything is recorded on a master program map, jointly sign and date the map. It is important that the pilot clearly understands where the buffer zones, sensitive areas, and spray block boundaries are at the treatment area.

If the control program is conducted by aerial application under APHIS contract, provide copies of the master program map to the aerial contractor. Also, aircraft pilots should be given copies of a map showing the treatment block. The maps for pilots can be at a scale of 1/4 inch or less to the mile because larger maps are difficult to work with in the cockpit.

Program managers and COR's can adjust the treatment boundaries to provide a more flyable block. Immediately inform all cooperators when such an adjustment is made. Some program guidelines may require that all adjustments to treatment block boundaries be made before the environmental assessments can be finalized.

Updating Program Maps

Updating the program maps is another important step. Refer to **Program Updates** under **Control Operations** in the **Program Supervision** section.

2

Aerial Application
Manual

Program Planning

Detailed Work Plan

Contents

Introduction [page-2-6-1](#)

Instructions for Completing a Detailed Work Plan and Checklist [page-2-6-2](#)

Distributing the DWP and Checklist [page-2-6-4](#)

Introduction

Ideally, in the process of implementing a control program, the following activities should be done:

- ◆ Complete the environmental documentation.
- ◆ Obtain cooperative agreement from the involved Federal agencies and non-Federal cooperators.
- ◆ Select a control option.
- ◆ Draft treatment boundaries.
- ◆ Obtain from Field Servicing Office (FSO) a copy of the Federal prospectus for aerial application and information about chemical contracts.

Also, the cooperators should have done the following:

- ◆ Initiate a request in writing (possibly accomplished through cooperative agreement).
- ◆ Show their cost share is on deposit via written request (could be handled when the cooperative agreement is submitted).
- ◆ Indicate land ownership on a master program map.

Prepare a Detailed Work Plan (DWP) (PPQ Form 136) and an accompanying Work Checklist for pretreatment planning (see [Figure 2-6-1](#) for a sample of a DWP). It is best to prepare these documents as far in advance as possible of the scheduled treatment. The DWP alerts the region for budgeting purposes and FSO for contracting purposes. The Work Checklist is a good aid to ensure that all necessary activities are completed (see [Figure 2-6-2](#) for a sample of a Work Checklist).

Instructions for Completing a Detailed Work Plan and Checklist

Ideally, the DWP is prepared well in advance as possible of the scheduled treatment, alerting the regional office and FSO of the needed resources. More realistically, the plan must be prepared quickly and contains a broad estimate of various costs. Figures from past programs are a helpful guide in preparing the DWP. Complete the DWP by entering the following information in the corresponding blocks.

- 1. Title:** Check the box for Detailed Work Plan.
- 2. Plan Number:** Enter the Work Unit, area, or Regional designated number.
- 3. Fiscal Year:** Enter the current fiscal year.
- 4. Est. Starting Date:** Estimate date the project will begin.
- 5. State:** Enter the State where project will occur.
- 6. Pest:** Enter the pest program name.
- 7. Counties:** Enter the county or counties where project will occur.
- 8. Environmental Assessment Name/Number:** Enter appropriate EA number.
- 9. Environmental Monitoring Required:** Check the appropriate box (see **Environmental Monitoring Coordinator** under **Environmental Monitoring** of the **Program Planning** section).
- 10. Pesticide/Biological Agent:** Enter the name of the alternative selected.
- 11. Formulation:** Enter the formulation of the product selected.
- 12. Rate of Application:** Enter the rate per acre to be used on the project.
- 13. Number of Applications:** Enter the number of times the area will be treated.
- 14. Method of Treatment:** Enter the aerial, ground equipment, etc.
- 15. Number of Aircraft Required:** Enter the number of aircraft needed to treat the block in the appropriate time frame. Refer to **Aircraft Selection** in the **Program Planning** section for information on selection of aircraft.

16. Category of Aircraft: Refer to **Aircraft Categories of Aircraft Selection** in the **Program Planning** section to determine the category of aircraft that will be requested.

17. Number of Observation Aircraft Required: Indicate the need for observation aircraft.

18. Percent Congested Area: Enter the percent of the treatment block that has congested area based on program maps. Also consider the ferry routes to the block.

19. Name and Location of Airstrip - Ferry Distance: Enter the name and city of the airstrip where the pesticide storage will be located. Ferry distance is the number of miles by air from the airstrip to the treatment block.

20. Location of Pesticide Storage: Select a storage site as close as possible to the airstrip.

21. Full Service Contract: Check appropriate box. **NOTE:** A full service contract is one in which the contractor arranges for or supplies all necessary equipment, supplies, and pesticide for the project.

22. Type of Guidance: Specify the type of aircraft guidance and who will be responsible for providing it (Contractor, Federal, State).

23., 24., and 25. Land Ownership: Using ownership maps, list the number of acres owned by each category.

26. Salaries: Estimate the total salary expenditure during the program for each category.

27. Per Diem: Estimate the total per diem expenditure during the program for each category.

28. Mileage and Vehicle Costs: Estimate the cost expenditure during the program for each category. Use regional office mileage figures for agency owned vehicles. Use actual figures for leased and GSA owned vehicles.

29. Misc: Enter other estimated associated costs that will be charged to the project, i.e., charges (if any) for ATV's or motorcycles.

30. Pesticide Storage Costs and Tank Rental: Enter the figure for the estimated cost associated with storage such as tank rental, containment berms, local labor and equipment rented, and cleanup following completion of project.

31. Pesticide: Enter the estimated pesticide cost figure in the appropriate categories. Cost can be divided among cooperators as with other charges.

32. Application: Enter the estimate of the contractor's costs to apply the pesticide. This may be distributed among cooperators.

33. Observation Aircraft: If a contractor aircraft will be used for observation, calculate the estimated number of hours required for the project and multiply by the hourly rate as listed in the Federal prospectus. Distribute costs accordingly.

34. and 35. Other: List other items associated with the project and distribute the costs accordingly.

36. Total: Total all columns.

37. Remarks/Treatment Results: Note any information that may be useful in the contracting process.

38. Cost Per Acre: Total all columns across and divide by the number of acres in the treatment block. This is the estimated cost per acre.

39. Signature of PPQ Plant Health Director: SPHD signs in this block.

40. Date: Enter the date DWP was prepared.

Distributing the DWP and Checklist

Submit to the regional office the DWP and the completed Work Checklist. Attach copies of request letters and other required documents, as applicable, such as results of Hopper analysis, copies of signed FONSI's and ROD's, and the cover page of the EA's covering the proposed program.

USDA-APHIS-PPQ <input type="checkbox"/> Detailed Work Plan <input type="checkbox"/> Work Achievement Report		Plan Number 2		Fiscal Year 3	
1		Est. Starting Date 4		State 5	
Pest (List species and/or species complex) 6			Counties 7		
Environmental Assessment Name/Number 8				Environmental Monitoring Required 9 <input type="checkbox"/> Yes <input type="checkbox"/> No	
Pesticide/Biological Agent 10		Formulation 11			
Rate of Application 12		Number of Applications 13			
Method of Treatment 14					
Number of Aircraft Required 15		Category of Aircraft 16			
Number of Observation Aircraft Required 17		Percent Congested Area 18			
Name and Location of Airstrip 19		Location of Pesticide Storage 20			
Ferry Distance:					
Full Service Contract 21 <input type="checkbox"/> Yes <input type="checkbox"/> No		Type of Guidance (Loran, GPS, etc.) 22			
Land Ownership Specify Private, State, Federal Agency, etc.		Acres		Other	
23		24		25	
Costs	PPQ	State	Other	.. Other	Total
Salaries 26					
Per Diem 27					
Mileage and Vehicle Costs 28					
Misc. (Communications, Supplies, etc.) 29					
Pesticide Storage Costs and Tank Rental 30					
Pesticide 31					
Application 32					
Observation Aircraft 33					
Other: 34					
Other: 35					
Total 36					
Remarks/Treatment Results 37				Cost/Acre 38	
Signature of PPQ Plant Health Director 39				Date 40	

PPQ Form 136 (January 95) Previous editions are obsolete

FIGURE 2-6-1: Sample of a Detailed Work Plan

WORK CHECKLIST																																																						
<p>1. Enter the following information:</p> <p>Detailed Work Plan number: _____</p> <p>Environmental Assessment number: _____</p> <p>Date the FONSI was signed: _____</p> <p>Management option selected in the ROD: _____</p>																																																						
<p>2. Has the U.S. Fish and Wildlife been contacted to identify issues and concerns regarding endangered species in the projected treatment area?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable</p>																																																						
<p>3. Will an Essential Data Sheet be prepared to contract for aerial application?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable</p>																																																						
<p>4. Will pesticide and storage facilities be ordered?</p> <p>Pesticide? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable</p> <p>Storage facilities? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable</p>																																																						
<p>5. Will resources for environmental monitoring be needed?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable</p>																																																						
<p>6. Estimate the acreage for each type of land ownership involved in the program. Also, indicate the following status of related documents: Y (Yes), N (No), or NA (Not applicable).</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Land Ownership</th> <th style="width: 15%;">Estimated Acreage</th> <th style="width: 20%;">Request Letter</th> <th style="width: 20%;">Cooperative Agreement</th> <th style="width: 15%;">Escrow Letter</th> </tr> </thead> <tbody> <tr> <td>Private</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>State</td> <td></td> <td></td> <td></td> <td>NA</td> </tr> <tr> <td>Bureau of Land Management (BLM)</td> <td></td> <td></td> <td>NA</td> <td>NA</td> </tr> <tr> <td>U.S. Forest Service (FS)</td> <td></td> <td></td> <td>NA</td> <td>NA</td> </tr> <tr> <td>Bureau of Indian Affairs (BIA)</td> <td></td> <td></td> <td>NA</td> <td>NA</td> </tr> <tr> <td>Farmers Home Administration (FMHA)</td> <td></td> <td></td> <td>NA</td> <td>NA</td> </tr> <tr> <td>Bureau of Reclamation</td> <td></td> <td></td> <td>NA</td> <td>NA</td> </tr> <tr> <td>Military</td> <td></td> <td></td> <td>NA</td> <td>NA</td> </tr> <tr> <td>Other:</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					Land Ownership	Estimated Acreage	Request Letter	Cooperative Agreement	Escrow Letter	Private					State				NA	Bureau of Land Management (BLM)			NA	NA	U.S. Forest Service (FS)			NA	NA	Bureau of Indian Affairs (BIA)			NA	NA	Farmers Home Administration (FMHA)			NA	NA	Bureau of Reclamation			NA	NA	Military			NA	NA	Other:				
Land Ownership	Estimated Acreage	Request Letter	Cooperative Agreement	Escrow Letter																																																		
Private																																																						
State				NA																																																		
Bureau of Land Management (BLM)			NA	NA																																																		
U.S. Forest Service (FS)			NA	NA																																																		
Bureau of Indian Affairs (BIA)			NA	NA																																																		
Farmers Home Administration (FMHA)			NA	NA																																																		
Bureau of Reclamation			NA	NA																																																		
Military			NA	NA																																																		
Other:																																																						
<p>7. Remarks:</p> <div style="border: 1px solid black; height: 100px; width: 100%; margin-top: 5px;"></div>																																																						

FIGURE 2-6-2: Sample of a Work Checklist

2

Aerial Application
Manual

Program Planning

Aircraft Selection

Contents

Introduction [page-2-7-1](#)

Aircraft Categories [page-2-7-2](#)

Determining the Number of Aircraft Required [page-2-7-3](#)

Introduction

When selecting aircraft for a specific program, consider the total area to be treated, the size of individual blocks, the time allotted for completion, available airstrips, ferry distances, the type of terrain, the number of personnel available to properly manage the operation, etc. It is impractical to operate large, fast aircraft on blocks that are less than 2 or 3 miles (3 to 5 kilometers) in length. It is also impractical to use small aircraft when the number required would congest the airstrip or for long ferry distances.

To facilitate the planning of PPQ programs, aircraft have been divided into categories on the basis of their size, speed, capacity, and expected performance. The swath spacings listed below are based on experience or past performance and should be the maximum allowed. However, provision is also made for swath checking when there is reason to believe the swath is not as wide as that shown, may not provide uniform coverage, or may not be acceptable for other reasons.

An example of this is the Douglas DC-3. This aircraft has an assigned swath of 300 feet for water mixtures (such as Bt formulations for gypsy moth eradication). Program managers using this aircraft and formulation for gypsy moth eradication have reduced the swath to 225 feet, and 200 feet is now recommended by many State agencies. The wider swath width shown in [Table 2-7-1](#) would still be appropriate for other pest programs such as grasshopper. Consult Aircraft and Equipment Operations before changing specifications outlined in [Table 2-7-1](#).

Aircraft Categories

Aircraft categories have been established to facilitate program planning for desired aircraft based on the insect life cycle, timing of application, support personnel, adequate airport space, required aircraft performance, length and strength of runways, taxiways and ramps, and the elevation and type of terrain to be treated.

The chart in **Table 2-7-1** lists aircraft by category, the assigned swath spacing for malathion, oil, and water mixtures, and the spray tip size required for the pesticide used.

TABLE 2-7-1: Aircraft by Category

Aircraft	Malathion, Sevin 4-Oil and all Oil Mixtures				
	Feet	Feet	8 oz/A Malathion	20/A Sevin 4-Oil	32 oz/A Orthene
Category A - Fixed Wing					
Douglas DC-4/DC-6	550	400	8010	8015	8020
Douglas DC-7B&7C	650	500	8015	8020	8030
Fairchild C-119	500	350	8010	8015	8020
L100-30 Hercules (w/Addis Pack Spraying System)	800	650	8008	8010	8015
Category B - Fixed Wing					
Curtiss C-46	500	350	8010	8015	8020
Douglas B-26	400	300	8010	8015	8020
Douglas DC-3/C-47	400	300	8008	8010	8015
Lockheed PV-2	400	300	8010	8015	8020
Martin 404	500	350	8010	8015	8020
Category C - Fixed Wing					
Ag-Cat (800 hp)	150	100	8003	8004	8006
Ag-Cat (1200 hp)	150	100	8004	8006	8008
Dromader M-18	150	100	8004	8006	8008
Piper Aztec PA-23 (500 hp)	150	100	8004	8006	8008
Thrush (800 hp)	150	100	8003	8004	8006
Thrush (1200 hp)	150	100	8004	8006	8008
Turbine Ag-Cat	150	100	8004	8006	8008
Turbine Air Tractor	150	100	8004	8006	8008
Turbine Thrush	150	100	8004	8006	8008
Category D - Fixed Wing					
Ag-Cat (A&B Models, 450 hp)	100	75	8002	8003	8004
Ag-Cat (B&C Models, 600 hp)	125	100	8002	8003	8004
Bellanca Eagle	100	75	8002	8003	8004
Cessna (all 188 Models)	100	75	8002	8003	8004
Piper Brave	100	75	8002	8003	8004

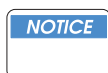
TABLE 2-7-1: Aircraft by Category (continued)

Aircraft	Malathion, Sevin 4-Oil and all Oil Mixtures				
	Feet	Feet	8 oz/A Malathion	20/A Sevin 4-Oil	32 oz/A Orthene
Piper Pawnee (120-260 hp)	100	75	8002	8003	8004
Stearman (450-600 hp)	100	75	8002	8003	8004
Thrush/Snow/Air Tractor	125	100	8002	8003	8004
Weatherly	100	75	8002	8003	8004
Category A - Helicopters					
Bell 204/205/212/214	150	120			
Sikorsky S-58-T	150	120			
Category B - Helicopters					
Aloutte III	120	100			
Category C - Helicopters					
Aloutette II	100	75			
Bell 206	100	75			
Bell Sely	100	75			
Hiller Sely	100	75			
Hughes 500	100	75			
Category D - Helicopters					
Bell 47	100	75			
Hiller 12E	100	75			

Determining the Number of Aircraft Required

The tables in **Table 2-7-2 - Table 2-7-5** are used as a guide for program planning purposes only.

Information presented are averages and may vary due to rounding.



The tables have been developed for an 8.0 fluid ounce per acre application rate of an oil base pesticide. You will need to make adjustments to the table for different application rates and water formulations.

Appendix A contains the **Worksheet for Determining the Number of Aircraft Needed for a Program**. This worksheet is useful for determining the number of aircraft you will require to complete a project based on the size of the treatment block and the number of days you have to complete it.

About the Following Tables

The information in the **Hrs. Per Trip** and the **Avg. Acres Per Hour** columns have been adjusted. Numbers listed in these columns include the time required for ferrying to and from the airport and aircraft turn- arounds in the treatment block. Use these figures in the Worksheet for Determining the Number of Aircraft Needed.

This is how the **Hr. Per Trip** column was calculated--Example: the turbine Thrush aircraft will hold an average load of 250 gallons. Two-hundred fifty (250) gallons divided by 2.56 gallons per minute = 98 minutes. Ninety-eight (98) minutes (times 2 allows for ferrying and turn arounds) = 196 minutes per trip. One-hundred ninety-six (196) minutes per trip. One-hundred ninety-six (196) (divided by 60) = 3.26 hrs. per trip.

These figures assume that blocks can be treated solid, are of a size best suited to the category of aircraft selected, and the aircraft can treat in both directions. Pesticide volume and area figures range from the least productive to the most productive of the most commonly used aircraft within each category.

TABLE 2-7-2: Aircraft Performance for Category A Aircraft

Aircraft	Speed MPH	Swath Feet	Acres per minute	Gal per Minute	Avg load Gallons	Acres per Load	Hrs per Trip	Avg Acres per Hour
Douglas DC-4	180	550	200.00	12.50	1,200	19200	3.20	
Douglas DC-6	220	550	244.44	15.28	1,500	24000	3.27	
Douglas DC-7B&7C	230	650	302.02	18.88	2,000	32000	3.53	
Fairchild C-119	180	500	181.82	11.36	1,200	19700	3.52	
L100-30 Hercules (w/Addis Pack Spraying System)	161	800	260.20	16.26	2,000	32000	4.10	
AVERAGES	194	610	237.70	14.86	1,580	25280	3.52	

TABLE 2-7-3: Aircraft Performance for Category B Aircraft

Aircraft	Speed MPH	Swath Feet	Acres per minute	Gal per Minute	Avg load Gallons	Acres per Load	Hrs per Trip	Avg Acres per Hour
Curtiss C-46	170	500	171.72	10.73	1,000	16,000	3.11	5.152
Douglas B-26	210	400	169.70	10.61	1,000	16,000	3.14	5.091
Douglas DC-3/C-47	160	400	129.29	8.06	700	11,200	2.89	3.879
Lockheed PV-2	190	400	153.54	9.60	850	13,600	2.95	4.606
Martin 404	210	500	212.12	13.26	1,000	16,000	2.51	6.364
AVERAGES	188	440	167.27	10.45	910	14,560	2.92	5.018

TABLE 2-7-4: Aircraft Performance for Category C Aircraft

Aircraft	Speed MPH	Swath Feet	Acres per minute	Gal per Minute	Avg load Gallons	Acres per Load	Hrs per Trip	Avg Acres per Hour
Ag-Cat (800 hp)	120	150	36.36	2.27	150	2,400	2.20	1,091
Ag-Cat (1200 hp)	130	150	39.39	2.46	200	3,200	2.71	1,182
Dromader M-18	130	150	39.39	2.46	150	2,400	2.03	1,182
Piper Aztec PA-23 (500 hp)	140	150	42.42	2.65	200	3,200	2.51	1,273
Thrush (800 hp)	150	150	45.45	2.84	250	4,000	2.93	1,364
Thrush (1200 hp)	125	150	37.88	2.37	250	4,000	3.52	1,227
Turbine Ag-Cat	150	150	45.45	2.84	100	1,600	1.17	1,455
Turbine Air Tractor	135	150	40.91	2.56	250	4,000	3.26	1,227
Turbine Thrush	160	150	48.48	3.03	300	4,800	3.30	1,455
AVERAGES	138	150	41.75	2.61	206	3,289	2.63	1,253

TABLE 2-7-5: Aircraft Performance for Category D Aircraft

Aircraft	Speed MPH	Swath Feet	Acres per minute	Gal per Minute	Avg load Gallons	Acres per Load	Hrs per Trip	Avg Acres per Hour
Ag-Cat A Model - 450 hp	90	100	18.18	1.14	50	800	1.47	545
Ag-Cat - 600 hp Model B & C	115	125	29.04	1.82	130	2080	2.39	871
Air Tractor - 60 hp	130	125	32.83	2.05	175	2800	2.84	985
Bellanca Eagle - 300 hp	100	100	20.20	1.26	100	1600	2.64	606
Cessna All 188 models	120	100	24.24	1.52	110	1760	2.42	727
Piper Brave - 300 hp	110	100	22.22	1.39	110	1760	2.64	667
Piper Pawnee - 230-260 hp	100	100	20.20	1.26	90	1440	2.38	606
Stearman - 450 hp	100	100	20.20	1.26	40	640	1.06	606
Thrush - Snow - 600 hp	120	125	30.30	1.89	150	2400	2.64	909
Weatherly Model 620 - 450 hp	105	100	21.21	1.33	110	1760	2.77	636
Weatherly - 620A & 620B	120	100	24.24	1.52	110	1760	2.42	727
AVERAGES	110	105	23.90	1.49	107	1709	2.33	717

Another way of calculating the number of aircraft required for 1 pint per acre of 1/2 pint per acre applications is to use the rule of thumb--one load per day for Categories A and B, and two loads per day for Categories C and D. Aircraft will not treat as much per week when terrain is rugged, requiring additional maneuvering or one-way application flights; when loads must be lifted to higher elevations; when block contains sizable areas not to be treated; or when the application rates and ferry distances are greater than those shown. Also, consideration should be given to weather conditions that may be encountered during the program. A rainy and windy season may reduce the flyable hours considerably, whereas mid-summer weather may provide somewhat longer flyable hours than those shown. In these cases, adjustments should be made accordingly.

Requests for Aircraft

Application Aircraft

Requests for aircraft should be made by specifying the minimum number required in a given Category. If it is also necessary to limit the total number of aircraft that can be used due to lack of personnel, crowded airstrip, or other reasons, the request for aircraft may be stated as “A minimum of four and a maximum of five Category A aircraft.” If more than one Category of aircraft is acceptable the request may be stated as “A minimum of four and a maximum of five Category A or B aircraft.”

If it is necessary to operate two or more aircraft of the same category in formation due to limited guidance or monitoring capability, matched aircraft should be requested. These requests should be specific, i.e., matched pairs, matched triplets, all matched within a given Category, etc. Matched aircraft should not be requested when there is no need for formation flying since this could unnecessarily increase the contractor's expenses.

When the area to be treated contains rough and rugged terrain - and particularly when it is at high elevations - include a statement in the bid invitation giving the approximate percentage of such terrain.

Observation Aircraft

A four-place observation aircraft should be included in the contract when use is required. Such an aircraft is valuable for showing contract pilots the boundaries of the blocks assigned to them and for transportation of a PPQ employee for aerial observation of the operation. A portable PPQ radio should be installed in the observation aircraft for communication with ground personnel. Observation aircraft with a minimum speed of 139 knots (160 mph) should be specified for use with Categories A, B, and the faster Category C aircraft. A slower observation aircraft is more useful when operating with the smaller, slower aircraft and helicopters.

A record of the number of hours the observation aircraft is flown at the request of the Government representative must be maintained on the Daily Aircraft Record (PPQ FORM 802). The Government pays an hourly rate for each hour flown for official business. Most aircraft have recording tachometers or flight recorders that show operation time in hours and tenths. If the observation aircraft is not so equipped, record the time of takeoff and landing.

When time permits, proposed requests for aircraft should be submitted for review by AEO, Aircraft section, prior to submission to FSO.

Aircraft Facilities

Airports and Airstrips

Airports or airstrips must be of adequate size to handle the aircraft that may be used on the program. Hard-surfaced runways are desirable when large multi-engine aircraft are used. The contractor must complete all arrangements necessary to use any airport.

Although the contractor must arrange for the use of any airport, you may obtain the following information to assist in your planning:

- ◆ Is it available for use by a commercial aerial applicator?
- ◆ Will there be a charge for its use, and if so, how much?
- ◆ Are there load limitations (especially important when the airport has hard-surfaced runways)?
- ◆ Is there a traffic control tower on the airport, and, if so, are radios required in agricultural aircraft?
- ◆ Can the aircraft be loaded near the takeoff runway to avoid excessive taxiing?
- ◆ Is there adequate space and security for pesticide storage?
- ◆ Is the storage area readily accessible to delivery trucks?
- ◆ Is other airport traffic such that there may be delays in landings and takeoffs at the time aerial applications are normally performed?
- ◆ Is aviation fuel available?
- ◆ Is there other pertinent information?

Minimum Airstrip Sizes

The airstrip length shown are for runways with clear approaches and average sod conditions at an elevation of approximately 4,000 feet above sea level. At higher elevations, or when fields are soft, longer airstrips will be required. Hard-surfaced runways at lower elevations may be somewhat shorter.

Category A - 1.4 miles (2.25 kilometers) long and 125 feet (38 meters) wide.

Category B - 1.0 miles (1.6 kilometers) long and 100 feet (31 meters) wide.

All Others - 0.6 miles (1.0 kilometers) long and 75 feet (23 meters) wide.

2

Aerial Application
Manual

Program Planning

Essential Contract Information

Contents

Aerial Program Description Data Sheet [page-2-8-1](#)
Directions for Completing a Description Data Sheet [page-2-8-1](#)

Aerial Program Description Data Sheet

This form is used primarily to request aerial contacts along with a supply of insecticide, storage facilities, of an observation aircraft, if necessary (see [Figure 2-8-1](#) for a sample of this form).

Along with the following directions, use the annual prospectus for aerial application for information to enter on the description sheet. The description sheet is part of the annual prospectus for aerial application.

Directions for Completing a Description Data Sheet

1. **Pesticide:** Enter the number of gallons needed to adequately cover the treatment block, plus or minus 25 percent. Refer to [Pesticides](#) in the **Program Planning** section.

Enter the pest program in the specified State.

Enter the estimated acres in the treatment block.

2. **Location:** Enter the location of the treatment block using county names, closest towns, or identified areas. For example, the description could read: a band starting 5 miles south of the city of Wilmington NC, south to Southport, then west to Seaside.
3. **Pesticide:** Enter the formulation, e.g., Sevin®4-Oil; and its dosage rate, e.g., 20.0 fl oz per acre.
4. **Location of pesticide storage site(s):** Enter the name and location of the airport that will serve as the base of the aerial application. Include a name and telephone number of an airport contact for delivering the pesticide.
5. **Pesticide will be delivered in:** Enter bulk, barrels, bags, or boxes based on the quantity of pesticides needed for the program. If the program is huge, enter bulk; if the program is small, enter barrel or box if that is the pesticide container requested. Refer also to [Pesticides](#) in the **Program Planning** section.

6. **Aircraft required:** When determining the aircraft required to support the program, consider item **12., Number of operational hours allowed to complete the contract**, because some aircraft operate faster than others. Other considerations that may influence your decision are: acres the aircraft can treat per minute/hour, swath width of the aircraft, airport restrictions, ferry distance, speed of the aircraft, altitude requirement, experience of contractor, and post contractor performance.

- A. Category and Number: See the Federal aerial application prospectus or this manual to determine the category and number of spray aircraft needed. **SUGGESTION:** For rugged terrain, consider using turbine powered aircraft. For flat terrain, turbine powered or others will be acceptable.

Matched: Yes or No: Enter yes if you want more than one aircraft to fly together at the same speed and at the same swath width following straight flight lines.

Same Make and Model: Yes or No: If you enter no and you have requested more than one aircraft, make sure the requested aircraft can fly well together.

- B. Observation; Enter the number of four-place aircraft needed with a designated minimum speed using **Table 2-8-1**.

TABLE 2-8-1: Determine the Minimum Speed of the Observation Aircraft

If the category of application aircraft is:	Then the minimum speed of the observation aircraft should be:
A	160 miles per hour
B	
C	150 miles per hour
D and helicopters	130 miles per hour

7. **Estimated average ferry distance and elevation range of work area:** Refer to the program map of the treatment block to identify the distance to the spray block from the airfield, and the elevation of the airfield and spray block.
8. **Minimum block size:** Enter the number of individual treatment block(s) and the total number of acres. Be prepared to describe individual blocks. The shape of blocks varies. **SUGGESTION:** Indicate anticipated length of runs, e.g., short runs over high elevation. Approximate percent of area not to be sprayed; Enter percentage of buffer zones within the treatment block.
9. **Congested areas, percent:** Enter the percentage of the treatment block in congested areas, e.g., city, town, community, or group of buildings. Refer to **Congested Areas** under **Control Operations** in the **Program Supervision** section.

10. **Estimated reporting date:** Enter the date and time (by noon) you want the contractor to report on site.
11. **Estimated starting date:** Enter the date and time to begin application. The date is an estimate when all aircraft, personnel, and equipment should be ready to begin spraying.
12. **Number of operational hours allowed to complete the contract:** Enter the maximum number of actual spray time needed to complete the treatment block. **Aircraft Selection** in the **Program Planning** section contains information needed to determine operational hours for various aircraft.
13. **Number of days required for State and/or Tribal Government certification:** Information necessary for out-of-State bidders. Consult State pesticide regulatory cooperators and/or respective tribal representative.
14. **Guidance: (Type: GPS, DGPS, Loran-C, or flagging):** (Type to be furnished and by whom): See the completed DWP. If not prepared, determine if Federal, State, or contractor personnel will be responsible for providing the guidance to navigate pilots during application. Also, identify the type of guidance to be furnished: Kytoon®, electronic equipment (i.e., GPS, DGPS, or Loran-C), or another method of ground flagging using mirrors, lights, or flags.
15. **Recording equipment. Furnished by Contractor or government:** Indicate if recording equipment is required and furnished by whom. Refer to the Federal prospectus.
16. **Pesticide loading equipment required:** Enter whether loading equipment is needed based on the pesticide being used. If needed, specify the loading equipment, such as pumps and meters. See the Federal prospectus.
17. **Pesticide mixing equipment required:** When the formulation is a suspension, then enter yes. Indicate the type of mixing equipment needed. See the Federal prospectus.
18. **Water transport:** When the formulation requires mixing with water, enter yes. The contractor is responsible for hauling water for mixing the pesticide. See the Federal prospectus.
19. **Name and phone number of Contracting Officer's Representative (COR):** Enter your name and phone number (program manager) for the regional office and FSO to call and get additional information related to the description data sheet.
20. **Weight factor for evaluation:** In order to effectively award a contract, the technical qualifications (including performance history) of a contractor should be considered along with a low

bid. Therefore, based on the environmental sensitivity of the program, place a percentage of importance (weight factor) on the technical qualifications required, as well as the price.

According to the Federal prospectus for aerial application, the weight factor may range from 20/80 (20 percent technical proposal and 80 percent price proposal) for standard jobs up to 60/40 for very sensitive jobs. A standard job would have no environmental concerns such as sensitive areas within the treatment area and/or extensive flagging around buffer zones.

21. **Site specific information:** Enter estimates of percentages of the various categories of terrain in the treatment block. Refer to the program map and land managers.
22. **Any additional information:** (Examples: deviation from listed swath spacing; Reduced rates of application; etc.)

SUGGESTION: Indicating the use of an alternate landing strip and the use of nurse tanks can provide the bidders with options of application logistics, which may improve the likelihood of lower bids and decrease overall expenses of a contract.

SUGGESTION: Based on the terrain, remoteness, and elevation of the treatment block(s), specify the need for and experienced mountain pilot.

SUGGESTION: Indicate unique or site specific circumstances that will help a contractor arrive to the airstrip with all necessary equipment. This will help avoid delays or maximize the effectiveness of the treatment.

SUGGESTION: PPQ will require the use of a boom timer (supplied by PPQ).

The following information will be included with each solicitation.

DESCRIPTION

1. Pesticide: _____ gallons/lbs plus or minus 25 percent, to be applied for control of _____ in the State(s) of _____ estimated number of acres _____
2. Location: _____
3. Pesticide: _____ Rate of application (actual formulation) _____ acre
4. Location of pesticide storage site(s): _____
5. Pesticide will be delivered in: _____ (bulk, barrels, bags, or boxes).
6. Aircraft required:
 - (a) Category & Number: _____ Matched: Yes or No: _____ Same Make & Model: Yes or No: _____
Fixed Wing: Yes or No: _____
 - (b) Observation: Yes or No: _____ with minimum speed of _____ m.p.h. (Note: If application aircraft is Category A or B = 160 mph, if application is Category C = 150 mph, or if application aircraft is Category D and all helicopters = 130 mph).
7. Estimated average ferry distance: _____ miles. Elevation range of work area: _____
8. Minimum block size: _____
Approximate percent of area not to be treated: _____
9. Congested areas, percent: _____
10. Estimated reporting date: _____
11. Estimated starting date: _____
12. Number of operational hours allowed to complete the contract: _____
13. Number of days required for State certification: _____
14. Guidance: (Type: GPS, DGPS, Loran-C, or flagging): _____
(See page 9 of this prospectus for a description of each). Furnished by contractor: Yes or No: _____.
Furnished by Government: Yes or No: _____.
15. Recording equipment. Furnished by contractor: Yes or No: _____. Furnished by the government: Yes or No: _____. (See page 9 of this prospectus for a description of recording equipment).
16. Pesticide loading equipment required: Yes or No _____
17. Pesticide mixing equipment required: Yes or No _____. Type _____. (Refer to Prospectus)
18. Water Transport: Yes or No _____. (Refer to Prospectus)
19. Name and telephone number of Contracting Officer's Representative (COR): _____
20. Weight factor for evaluation: _____ % Technical Proposal; _____ % Price Proposal
21. Site specific information: Rough terrain _____ % Sensitive Areas _____ % Water _____ % Buffers Required _____ %
22. Any additional information: (Examples: Deviation from listed swath spacing; Reduced rates of application; etc.) _____

BID SCHEDULE

ITEM NO. 1

Offeror to furnish all Aircraft, Personnel, Facilitating Equipment, and services that fully comply with all terms and provisions herein specified and Prospectus No. 45-M-APHIS-95, dated January, 1996.

Prompt Payment Discount _____ % _____ Days

FIGURE 2-8-1: Sample of a Description Data Sheet

2

Aerial Application
Manual

Program Planning

Personnel, Materials, and Equipment

Contents

Introduction	page-2-9-1
Personnel	page-2-9-1
Mandatory Requirements	page-2-9-2
Duties of Program Personnel	page-2-9-2
Instructions for Boundary Flagging	page-2-9-6
Equipment and Supplies	page-2-9-11

Introduction

The Contracting Officer (CO) at FSO in Minneapolis will designate, in writing, the individual who will act as the authorized representative (COR) to administer the contract. All contacts with the CO relative to the contract(s) or the contractor's performance should be made directly by the program supervisor who is designated as the COR.

Personnel

The size of a program and the type of terrain dictate the number of people needed to satisfactorily complete the program. As a general rule, the following list of jobs is required to run a program covering 100,000 acres if aircraft guidance is provided by the contractor. This list contains the ideal number of persons to have per program. Staffing requirements depend on the number of programs, acres, buffer zones, treatment blocks, and aircraft; type of terrain; and extent of environmental monitoring. Program managers request the following necessary personnel from the regional office.

- ◆ 1 COR
- ◆ 1 non-PPQ cooperator (COR counterpart, i.e., State or Federal cooperating agency)
- ◆ 1 timekeeper (can also serve as a clerk)
- ◆ 1 person for environmental monitoring
- ◆ 4 (2 at a minimum) surveyors/ground observers for flagging boundaries, placing dyecards, and noting aerial hazards and sensitive areas
- ◆ 1 PPQ pilot, if available
- ◆ 1 clerk, if available

Mandatory Requirements

All USDA, APHIS, PPQ personnel who plan, supervise, recommend, or perform pesticide treatments must be certified under the APHIS pesticide certification plan. They are also required to know and meet any additional qualifications or requirements of the States where they perform duties involving pesticide use. Those personnel who are surveyors and flaggers, or temporary personnel assigned to a certified applicator, do not need certification.

All USDA, APHIS, PPQ personnel will have baseline cholinesterase tests before the first application of insecticides, and when deemed appropriate thereafter. Also, it is recommended that contract, State, and private program personnel participate in a cholinesterase monitoring program.

Duties of Program Personnel

Contracting Officer's Representative (COR)

The purpose of the COR is to have a single authority for supervising a control program, allowing all other interested parties to serve as consultants, advisors, and cooperators.

COR's act as on-site representatives for CO's, administering the terms of contracts established to conduct control programs. COR's are responsible for safe, environmentally sound, cost-effective, and efficacious ways to suppress target pest populations which meet cooperator's needs. Their activities include the following:

- ◆ Determine the number of personnel required.
- ◆ Assign personnel to specific duties.
- ◆ Coordinate the work of the field crew who scout and delimit the areas to be treated.
- ◆ Divide the unit into blocks.
- ◆ Coordinate electronic guidance as required.
- ◆ Determine the amount of equipment required such as vehicles, maps, radios, flagging materials, forms, etc.
- ◆ Coordinate the public relations programs.
- ◆ Assign aircraft to the various blocks in cooperation with the COR and the PPQ pilot.
- ◆ Determine the amount of storage required for the pesticide.

- ◆ Brief pilots on blocks assigned to them for treatment, including flight direction, topographic hazards, and sensitive or restricted areas to be avoided.
- ◆ Determine, in cooperation with the PPQ pilot, the daily starting and stopping times for aerial applications.
- ◆ Maintain an adequate supply of pesticide.
- ◆ Collect and mail samples of pesticide for analysis when required.
- ◆ Keep maps up to date.
- ◆ Keep records as required.
- ◆ Submit a report on contractor performance.
- ◆ Designate, in writing, a PPQ officer program person to act in his/her behalf during any absence.
- ◆ Maintain communications with program managers, cooperators, and other necessary individuals.

Airstrip Supervisor

An airstrip supervisor should be designated to act for the COR at each airstrip when aircraft are to operate simultaneously from more than one airstrip. The airstrip supervisor will be in charge of operations at the airstrip to which assigned during the absence of the COR. This person must maintain accurate base logs that document the daily operations. The duties of the airstrip supervisor are sometimes carried out by the timekeeper as availability of personnel permits.

Airport Recorder (Timekeeper)

An airport recorder should be assigned to each airstrip to maintain complete and accurate records of all occurrences to include the following:

1. Daily Aircraft Record, PPQ Form 802. PPQ Form 802 is a legal, written record of spray operations for a given day. Refer to **Daily Aircraft Record (PPQ Form 802)** of the **Program Supervision** section for information and instructions on the form.
2. Pesticide Record—During a program it is very important to keep an accurate inventory of pesticide supplies in storage and amounts that have been used. The airport recorder must keep an accurate record of the:
 - A. Amount applied to each block
 - B. Daily amount applied
 - C. Daily amount received
 - D. Amount on hand at end of each day

At all times when aircraft loading operations are in progress, an agency representative should remain in the loading area and determine the exact amount of pesticide that is loaded into each aircraft for each trip. This may be the duty of the airport recorder or other individual(s) assigned to this job. These individuals **do not** assist in loading pesticide onto the aircraft.

3. Other Duties That May Be Assigned to the Airport Recorder—The following duties may be assigned to the airport recorder depending on the availability of an airstrip supervisor or during the absence of the COR:

- A. Checks aircraft spray systems to include:
 - i. Checking nozzles, hoses, booms, and hopper for leaks
 - ii. Checking systems for compliance with contract specifications, such as nozzle number, size and type; shutoff valves; by-pass lines; etc.
- B. Ensures boom timers (if required) are installed, are operating, and are reset, if necessary
- C. Supervises loading of the aircraft to include:
 - i. Determining the amount of chemical to load
 - ii. Checking the aircraft hopper prior to loading to determine the amount of pesticide being used
 - iii. Observing actual loading and metering of pesticide. **DOES NOT** physically assist in handling or loading fuel or pesticide into the aircraft.
 - iv. Informing the COR when reserves get low enough to warrant additional delivery
 - v. Observing actual unloading and draining of aircraft at end of operations
- D. Documents complaints and records visits and telephone calls from the public regarding program activities
- E. Monitors weather conditions
- F. Tracks spray progress to include:
 - i. Advising ground observers when aircraft leaves and returns to the airstrip
 - ii. Keeping up with progress of aircraft
 - iii. Making changes in flight schedules if need arises (i.e., avoid a field with people in it)
 - iv. Recording fields missed entirely or sprayed inadequately and rescheduling needed treatments

- G. Documents problems and unusual events that occur during spray operations to include:
- i. Accidents involving aircraft, vehicles, or personnel
 - ii. Safety violations or unsafe practices by contractor or program personnel
 - iii. Pesticide spills or dumps
 - iv. Leaks in either the aircraft systems or the pesticide storage or loading systems

Ground Observer (Scout)

Scouts are very important for a successful treatment operation. The primary function of the ground observer is to monitor the overall job performance of both the pilot and his/her aircraft or treatment area during spray operations.

Duties and responsibilities of the ground observer include:

- ◆ Delimit areas to be treated.
- ◆ Flag block boundaries when necessary.
- ◆ Locate and mark on maps the areas not to be treated.
- ◆ Indicate on maps the location of hazards to aircraft.
- ◆ Determine latitude and longitude coordinates for GPS guidance as necessary.
- ◆ Perform such other duties as may be required to get a program into operation.
- ◆ Assist in tracking the aircraft at all times (when practical).
- ◆ Observe pilot performance by checking the number of swaths applied to a field to determine effectiveness and efficiency of spraying.
- ◆ Monitor flight path such as turns over ponds, houses, or other sensitive areas.
- ◆ Monitor application aircraft height of flight.
- ◆ Watch for cutoff of chemical on turns, sensitive area, and traveling between fields.
- ◆ Observe trimming of fields and skips.
- ◆ Report where trim work will have to be completed by ground equipment due to obstacles such as power lines and trees.
- ◆ Monitor temperature of air and ground, and wind speed.
- ◆ Dyecard (sampler) placement--Refer to **Monitoring Spray Deposition** under **Control Operations** in the **Program Supervision** section.

- ◆ Observe chemical dispersion, drift, and inversions.
- ◆ Check for clogged or leaking nozzles.
- ◆ Place and collect dye cards to track chemical dispersal.
- ◆ Maintain radio contact to report conditions and information to the COR, aerial observer, or airport recorder.
- ◆ Establish the boundaries of the areas treated that day and shade the area map.
- ◆ Discuss areas that were skipped or missed and plan for their treatment. Give consideration of wind direction and velocity during original treatment and reflights.
- ◆ Discuss work plans for the following day, including a review of flight hazards and sensitive areas that may be located within or adjacent to the work areas.

Instructions for Boundary Flagging

Types of Boundary Flagging Material

- ◆ White or yellow muslin or cheesecloth
- ◆ White and orange plastic

White flags are used for block boundaries and the orange flags are used to mark sensitive sites and buffer zones and other no spray areas. All boundary flagging used in the block must be marked on the program map.

Boundary Flags

- ◆ Should be a minimum of 15 feet long and at least 3 feet wide
- ◆ Can be tied to fence lines or weighted or staked down to the ground
- ◆ Must be easily visible from the air for at least 1 mile or they are worthless
- ◆ May be attached to lath if no fence line is available
- ◆ Should be placed on high places, even though the end of the block may be just over the hill

Recommended Placement of Flags

- ◆ Place the perimeter of the spray block approximately every one-half mile. More flagging can be used as site specific circumstance demand.
- ◆ From the corner of the spray block, use 25 to 30 feet down each side.

- ◆ Perimeters around sensitive areas should be marked with orange flagging. Place as many flags as needed to be able to recognize the “outline” from the air.

PPQ Pilot

A PPQ pilot should be contacted in advance of all aerial operations and, when available, will be assigned to the program to assist the COR. PPQ pilot functions include:

- ◆ Review all documents relating to contract aircraft and pilots.
- ◆ Inspect each aircraft and its dispersal apparatus to determine whether it complies with contract specifications and FAA requirements.
- ◆ Check swath widths and deposit distribution and recommending modifications in dispersal equipment when required.
- ◆ Calibrate the dispersal apparatus.
- ◆ Determine whether contract pilots are qualified.
- ◆ Assist with the layout of block boundaries.
- ◆ Observe aerial applications from the air and align guidance when required.
- ◆ Cooperate with the COR in determining daily starting and stopping times for aerial applications.
- ◆ Act as radio liaison when required.
- ◆ Train personnel in the procedures and techniques of aerial observers.
- ◆ Monitor the electronic guidance system as required, checking its accuracy and reliability, and checking to determine whether contract pilots are using the system properly.
- ◆ Train contract pilots and PPQ personnel in the use of electronic guidance equipment when required.

PPQ pilots have the following specific authority, when present on a contract:

- ◆ Withhold any aircraft from operation until it complies with contract specifications.
- ◆ Reject any pilot who does not meet contract requirements.
- ◆ Ground any aircraft or pilot for cause.
- ◆ Establish or verify the working swath widths for each aircraft.

The PPQ pilot will contact the CO directly only when requested to do so by the COR. In the event a PPQ pilot is not available, the responsibilities noted above rest with the COR.

Aerial Application Observer

The aerial observer is either the COR or a designated person. Aerially observing the control activities provides the COR with a unique view of the application and movement of the ground personnel. In many cases, the aerial observer is the practical center of communication with the COR, the contractor, the pilot, and the ground crew.

If a contract observation aircraft is to be used, a trained PPQ officer or cooperator observer will be required. Prior to making any flight, the observer should meet with the pilot of the observation aircraft and mutually agree to the following:

Only those flights authorized by the observer or COR will be considered for payment within the terms of the contract.

During such flights, only PPQ personnel, cooperators, or contractor personnel will be carried.

The observer will have full authority, within the limits of safe flight operations, to determine when, where, and how the aircraft shall be flown for the purpose of making observations.

The contractor's pilot will, in the interest of safety, be fully responsible for the aircraft and its operation and therefore may deviate from the observer's instructions when safety is involved.

An accurate record of flight time should be kept on a Daily Aircraft Record, PPQ Form 802. Flight time will be the actual time shown on the flight recorder. For aircraft without a recorder, use clock hours and minutes from takeoff to landing. Each PPQ Form 802 shall be signed by the contractor's representative and the timekeeper.

Arrange with the pilot to install a PPQ radio in the observation aircraft. A suitable substitute would be a portable hand-held unit. **If the external power source cable of the radio is used, it should be connected to the aircraft's electrical system by the contractor's personnel ONLY.** This would also include installation of an external antenna, modifications, or other equipment.

Proficiency in aerial observation and supervision requires the ability to:

- ◆ Judge ground distances from the air by reference to the size of known objects and distances such as road width, distance between telephone poles, etc.
- ◆ Judge swath spacing accuracy based on the application aircraft wingspan and landmarks flown over on the previous swath. When the sun is out, using the application aircraft's shadow on the ground is a good method to judge spacing.

- ◆ Time the application aircraft with a stopwatch to compute the dispersal rate for calibration.
- ◆ View the treatment block, surrounding area, and ferry routes from the air.
- ◆ Communicate instructions effectively using radios.

The most critical daily decision in aerial application is the cooperative decision to shut down the daily activities because of developing conditions that adversely impact spray deposition. The aerial observer provides information to the COR for deciding when to shut down the daily activities.

Duties and responsibilities of the aerial observer include monitoring the following:

- ◆ Application aircraft and guidance aircraft, if used
- ◆ Watch for plugged nozzles
- ◆ Pesticide drift
- ◆ Air speed
- ◆ Flight line formation
- ◆ Swath spacing
- ◆ Uniformity of spray pattern
- ◆ Turnarounds
- ◆ Insecticide dumps
- ◆ Skips
- ◆ Swath displacement
- ◆ Proper shut off and turn on at boundaries and buffer zones
- ◆ Movement of ground personnel and flagging
- ◆ Coordination and communication of activities of all personnel

Guidance Flaggers

Flaggers are needed when precise applications are required over areas too small for electronic guidance, when other guidance is not available, or when pilots may have difficulty in uniformly spacing their swaths. Their primary duty is to operate markers that will enable the pilot to fly straight, equal-spaced swaths. Other duties may include many of the items listed for scouts.

In most cases, flaggers will be provided by the contractor, depending on how the bid description is completed. See item **14.** of the Description Data Sheet in **Essential Contract Information** in the **Program Planning** section. The flaggers may or may not be part of the required PPQ personnel.

Before going on the flag line, there are certain preparations that should be made. A flagger must receive adequate briefing and/or training to know:

- ◆ The area to be flagged
- ◆ The direction of flight
- ◆ On which side of the area the application will begin
- ◆ Which direction and how far to move while flagging
- ◆ The swath spacing of the aircraft being guided
- ◆ Wind direction and pesticide drift
- ◆ The height at which the aircraft should fly
- ◆ The type of marker or flag being used and how to use it properly
- ◆ If a Kytoon® is used, its proper care
- ◆ How to use a radio when one is assigned
- ◆ How to space for more than one aircraft
- ◆ Proper type and use of personal safety equipment

Pilots prefer to spray crosswind, start on the downwind side, and work upwind. In this way, the aircraft will not fly through the spray from previous swaths. This also protects the flaggers from the spray.

The flaggers must have a map of the area(s) to be treated. Operational time will be saved if the flagger can visit the area(s) in advance to check on roads, open fields, or other routes to follow while flagging.

Various equipment is used for flagging aircraft. Local project circumstances determine the best method or combination of methods to use. The following lists the most effective ground flagging techniques:

- ◆ Kytoon® aerial helium balloons
- ◆ Measuring wheel
- ◆ Mirrors
- ◆ Halogen spotlights
- ◆ Rotating beacons
- ◆ Flags on poles

Electronic aircraft guidance is covered in **Aircraft Guidance** in the **Program Startup** section. The following techniques are used by ground flaggers. Training on the proper use of flagging equipment is important prior to their use. All flaggers in the block should be coordinated and able to communicate by two-way radio.

Environmental Monitoring Coordinator

Environmental monitoring protocols may need to be implemented at the control block because of program guidelines, NEPA requirements, Environmental Monitoring Plans (EMP's), or because of sensitive areas, site specific conditions, and mitigating circumstances.

Refer to **Environmental Monitoring** in the **Program Planning** section for additional information.

Equipment and Supplies

The following list are items with approximate amounts needed for a 100,000 acre project:

TABLE 2-9-1: Vehicles and Related Equipment

Items	Amount
2 wheel drive (WD)2	2
4 WD2	2
Pickups	3
Rental vehicles	as needed
Barrel truck	as needed
Tow chain	1/vehicle
5 gallon gas can	1/vehicle
Halogen spotlight	1/vehicle

TABLE 2-9-2: Radios

Items	Amount
Hand held	1/person
Installed in vehicles	1/vehicles

TABLE 2-9-3: Weather Instruments

Items	Amount
Weather station	1
Wind gauges	12
Thermometers	12

TABLE 2-9-4: Pesticides

Items	Amount
Consult pest program manuals or guidelines for available alternatives and application rates. Refer to Pesticides and Pesticide Storage in the Program Planning Section.	

TABLE 2-9-5: Dyecard Samplers

Items	Amount
White oil sensitive (malthion)	1,000
Black 3-1/2 inch by 5 inch (carbaryl)	1,000

TABLE 2-9-6: Maps

Items	Amount
Control area maps	20
colored pens/pencils	1 box
Local State road maps	1/vehicle

TABLE 2-9-7: Flagging Material and Markers

Items	Amount
Muslin	200 yards
Orange plastic rolls	100 yards
Plastic ribbons	100 yards
Wire flags	500

TABLE 2-9-8: Miscellaneous

Items	Amount
GPS imot	1 per vehicle
Clipboards	4
Stopwatch	1
Compass	as needed
Signaling mirrors	2 per vehicle
Bung wrenches	2
Funnel with strainer screen	1
Garbage barrel at base or airstrip	1

TABLE 2-9-9: Safety Equipment

Items	Amount
First aid kit	1 per vehicle
Eye wash kit	1 per vehicle
Hearing protection	1 per person
Poisonous bite and sting kit	1 per vehicle
Water cans (5 gallons)	2 at base
Fire extinguisher	1 per vehicle
Roadside reflectors	1 pair per vehicle
Tool kit	1 per vehicle
Jumper cables	1 per vehicle
Shovel	1 per field vehicle

TABLE 2-9-10: Spill Kit at Pesticide Storage Area

Items	Amount
50 gallon plastic garbage can with wheels (to hold contents)	2 per kit
Rain suits—unlined or disposable coveralls	2
Rubber gloves—unlined	4 pair
Rubber boots—unlined	2 pair
Approved respirator with approved canisters	2
Goggles/safety glasses	2 pair
Emergency eyewash kit	2 per kit
Shovel—square tip	1
Shovel spade tip	1
Bar soap	2
Lime	50 pounds
Lye (sodium hydroxide - NaOH)	50 pounds
Lime and Lye MSDS	1 each
Pesticide label and MSDS	1 each
Kitty litter	100 pounds
Liquid detergent	1 quart
Potable water	5 gallons per kit
Scrub brushes	2
Broom/dustpan	1 each
Heavy duty plastic garbage bags	50
Plastic tarp (25 ft. x 25 ft.)	1

TABLE 2-9-11: Forms

Items	Amount
Time and Attendance sheets (T&A's)	24
Travel vouchers	12
Daily Aircraft Record (PPQ Form 802 Mar 92)	15 pads
Vehicle Accident Report Forms	1 per vehicle

2

Aerial Application
Manual

Program Planning

Memorandums of Understanding and Cooperative Agreements

Contents

Introduction [page-2-10-1](#)

Memorandums of Understanding [page-2-10-1](#)

Cooperative Agreements and Interagency Agreements [page-2-10-1](#)

Introduction

Pest management programs often require cooperative involvement with other Federal agencies and non-Federal cooperators, such as State cooperators, ranchers, land managers, grower cooperatives, and other private landowners. To confirm agreed-to responsibilities and cost sharing, APHIS requires memorandums of understanding (MOU's) to be established with other Federal agencies, and cooperative agreements with non-Federal cooperators.

Memorandums of Understanding

MOU's are established with each Federal agency that manages land when cooperative pest management programs such as grasshopper control are administered by APHIS. MOU's are put in place and signed at the Washington level. Identify what Federal public areas are present in each State and review related MOU's to better understand the agreed responsibilities to conduct a pest management program.

A sensitive issue to be aware of is treatment of Native American land, which should be covered under MOU's with the Bureau of Indian Affairs (BIA). Have a written request from BIA and the Tribal Council, and approval from the Tribal Council to treat Native American lands.

Cooperative Agreements and Interagency Agreements

some pest management programs are initiated by the voluntary activities of States, ranchers, land managers, grower groups and other private landowners who must request assistance from APHIS and/or the State and commit to share program costs before a control program is planned or initiated. Upon request and depending on available

funds, APHIS is responsible for cooperating with States, ranchers, land managers, grower groups, or other landowners in planning and implementing control activities.

Federal land managers are required to request in writing that their land be treated for grasshopper control. These letters of request may originate as telephone calls. However, a backup letter is necessary for the expenditure of program funds.

Individual pest program or regional office administrative procedures also must be followed when developing cooperative agreements.

When preparing a cooperative agreement with a State or other cooperator, the language may be changed or language may be added to the agreement to meet special needs and circumstances. Changes are subject to regional approval. An example of a change may be to add wording to the agreement so it can also serve as the letter of request.

Refer to each program for specific examples of MOU's and cooperative agreements and interagency agreements.

2

Aerial Application
Manual

Program Planning

Aircraft Operations Support

Contents

Introduction [page-2-11-1](#)
Requesting a PPQ Pilot [page-2-11-1](#)

Introduction

Arranging for PPQ pilots should be done early in the planning process in order to give them as much lead time as possible.

PPQ pilot duties and authorities are described in **Duties of Program Personnel** under **Personnel, Materials, and Equipment** in the **Program Planning** section. PPQ pilots have the technical knowledge and expertise to perform important tasks in support of the project.

When a PPQ pilot is on site, the probability of conducting a successful project is greatly increased.

Requesting a PPQ Pilot

Requests for PPQ pilots should be made by contacting the following individuals at

APHIS, PPQ Aircraft and Equipment Operations (AEO):

Timothy J. Roland, Director
USDA APHIS PPQ
Aircraft and Equipment Operations

Mailing address:
Route 3, Box 1001
Edinburg, TX 78539

Overnight address:
Moore Airbase, Building 6415
Mission, TX 78572

Phone: 210-580-7270
Fax: 210-580-7276

Billy F. Tanner, Lead Pilot
USDA APHIS PPQ
Aircraft and Equipment Operations

Mailing address:
Route 3, Box 1001
Edinburg, TX 78539

Overnight address:
Moore Airbase, Building 6415
Mission, TX 78572

Phone: 210-580-7388
Fax: 210-580-7389

2

Aerial Application
Manual

Program Planning

Pesticides

Contents

Introduction	page-2-12-1
Procuring the Pesticide	page-2-12-1
Pesticide Containers	page-2-12-3
Formulas	page-2-12-3
Interval Swath Technique	page-2-12-4
Definitions	page-2-12-4

Introduction

Depending on the situation, APHIS, a cooperator, or the contractor may provide the pesticide for cooperative control. Also, depending on the decision of all cooperators, the aerial application may be contracted by APHIS or a cooperator. Related information regarding pesticides is found in **Pesticide Storage** in the **Program Planning** section and **Worksite Organization and Inspection** in the **Program Startup** section.

Procuring the Pesticide

There is a number of ways to procure the pesticide:

- ◆ Size of the project
- ◆ Through excess stocks held by other States
- ◆ Through procurement on the open market by cooperators
- ◆ Regional purchase order (AD 700 Procurement Request) via a national pesticide contract
- ◆ Part of a full service contract
- ◆ Part of a standby contract such as the Grasshopper Crop Protection Program
- ◆ Regional or programmatic guidelines

The specific needs of a program will influence the way to procure services. Consider the following factors:

- ◆ Method of application: ground versus aerial application.

- ◆ Estimated costs of application and pesticide. Consider the size of the treatment area, use historical figures for aerial application, and include the cost of pesticide application and storage (include disposal and berming, if applicable).
- ◆ Timeliness: Match the amount of time it takes to procure with the optimum application dates or pest development. Allow up to 2 weeks to process a full service contract through FSO.

Amount to Order

Ordering the correct amount of pesticide and determining if to receive in bulk or barrels

is an important logistical decision of the project. Formulas for ensuring adequate supplies of pesticides are found in **Pesticide Supply** in the **Program Supervision** section.

Ordering Too Much

The following may occur if you order too much pesticide:

- ◆ Chemical is expensive and will tie up program funds.
- ◆ Project incurs added shipping charges when receiving.
- ◆ Storage costs continue after completion of project.
- ◆ Incur added shipping charges to transfer.
- ◆ Extra material may have to be disposed as hazardous waste.
- ◆ Added safety risks with long term storage.

Ordering Too Little

Ordering too little pesticide may cause the following:

- ◆ Delays in program completion.
- ◆ A portion of the treatment area to remain untreated.
- ◆ Changes in aircraft calibration or swath patterns to “stretch” supplies may reduce efficacy.

To determine the initial amount of pesticide to order:

Obtain a very accurate estimate of total acres within the treatment block. Refer to program maps, landowners, and cooperators.



If the terrain of the treatment block is rough, extra pesticide may be needed. Example: The acres determined from maps may be less than actual acres if the treatment area has rugged topography. An estimate is necessary to accurately determine supply, or shortages may occur.

Pesticide Containers

Consult program guidelines and local and State pesticide regulations when deciding the type of containers to use. Also refer to **Pesticide Storage** in the **Program Planning** section. Consider the size of the project and if you should receive pesticide in bulk shipments or smaller containers such as barrels or bags. You may also want to specify in the pesticide order that you require returnable tanks or barrels to alleviate the problem of disposal.

The type of container in which you will receive the pesticide is important for several reasons. Pesticide containers require special handling after they are empty. Disposal of the containers may be expensive, time consuming, or impractical depending on the type and number of containers specified.

Formulas

Step 1—Determine the Number of Acres a Gallon of Pesticide Will Treat

$$\frac{128 \text{ fluid ounces (per gallon)}}{\text{Application rate per acre in fluid ounces}} = \text{Acres 1 gallon of pesticide will treat}$$

Step 2—Determine Amount to Order

$$1. \frac{\text{Acres within treatment block boundaries} - \text{Acres (if any) of buffer zones and sensitive no spray zones}}{\text{Acres to be treated}}$$

$$2. \frac{\text{Acres to be treated}}{\text{Acres 1 gallon of pesticide will treatment area}} = \text{Gallons of pesticide required for}$$

Example

Step 1

$$\frac{128.0 \text{ fl. oz. per gallon}}{20.0 \text{ (20.0 oz. per acre rate of Sevin 4® Oil)}} = 6.4 \text{ acres 1 gallon of pesticide will treat at this rate}$$

Step 2

1.
$$\begin{array}{r} 67,525 \text{ acres within boundary} \\ - 01,250 \text{ acres of no spray area} \\ \hline 66,275 \text{ Total acres} \end{array}$$
2.
$$\frac{6,275 \text{ acres to be treated}}{6.4 \text{ acres 1 gallon will treat}} = 10,355 \text{ gallons of pesticide required for treatment area}$$

In this example, 10,355 gallons of pesticide are needed to treat the block. Refer to **Pesticide Storage** in the **Program Planning** section, and **Pesticide Spills** in the **Program Supervision** section for a list of supplies to assemble a spill kit.

Interval Swath Technique

Interval swath techniques are being used by program managers in some situations as a way to reduce costs while maintaining effective management. In brief, intentional “skips” or intervals are left between swaths. Flow rates are not changed. Pests with a migratory nature such as grasshoppers or Mormon crickets eventually may enter a treated area. Savings to the project are gained by reduced pesticide and application costs.

Treatment projects utilizing interval swathing techniques would require one additional step to arrive at the correct amount of pesticide to order. The untreated interval must be accounted for to avoid obtaining too much pesticide.

Definitions

Assigned Swath—The swath width designated for the type of aircraft being used.

Interval Swath—The swath width the aircraft actually flies (Track).

After arriving at the gallons required for the treatment area, you must reduce the pesticide order by the same percentage as you increase the swath width.

Formula

Step 1

$$\frac{\text{Assigned swath}}{\text{Interval swath}} = \text{Correction factor}$$

Step 2

Gallons required for treatment area
x Correction factor

Gallons of pesticide to order when using interval swath technique

Example

Using the previous example, determine the correction factor to use. Assume you are using a turbine thrush aircraft and Sevin® 4-Oil. The assigned swath for this aircraft and chemical is 150 feet. For other aircraft and formulations, refer to **Aircraft Selection** in the **Program Planning** section. Also, assume you have decided on an interval swath assignment of 200 feet (100 foot untreated area (interval) between treated areas).

Step 1

$\frac{150 \text{ feet}}{200 \text{ feet}} = 0.75 \text{ correction factor}$

Step 2

10,355 gallons
x 0.75 correction factor

07,766 gallons to order if using interval swath technique in this example

2

Aerial Application
Manual

Program Planning

Pesticide Storage

Contents

Introduction	page-2-13-1
Bulk Storage Containers	page-2-13-2
Storage Area Location	page-2-13-3
Berming Tanks	page-2-13-3
Dry Pesticide Formulations	page-2-13-4
Pesticide Spills	page-2-13-4

Introduction

The information regarding storage is referenced in part from the Pesticide User's Guide,

1990, by Bert L. Bohmont. The book contains glossaries, illustrations, and general factors to consider when using any pesticide. This user's guide should be part of your work unit's reference materials.

The safety procedures presented in this section are not intended to limit program activities. Rather, use the procedures and references to develop a safety program given special circumstances encountered in each work unit. Contingency plans for emergency response should be developed for aerial programs.

Important information regarding the safe handling and storage of pesticides can be found on the pesticide label and the Material Safety Data Sheet (MSDS). Be sure the label and the MSDS you are using are current.

Proper storage of pesticides will protect the health and well-being of people, help protect against environmental contamination, and protect the chemical shelf life. A number of fairly rigid conditions is required for the storage of pesticides intended for agricultural and industrial use. The following are major items which everyone should be completely familiar.

- ◆ Storage in a separate building or area is preferable.
- ◆ Store all pesticides in their original, labeled containers; never store in food, feed, or beverage containers.
- ◆ Use check valves to avoid back siphoning
- ◆ Keep lids of containers tight and tops of bags closed when not in use.

- ◆ Containers of liquid and dry material should be stored on pallets to prevent damage from water. Do not let rain water collect on top of barrels/tanks.
- ◆ Periodically check all containers or tanks for leaks.
- ◆ No underground storage.
- ◆ Try to avoid storing unnecessarily large quantities of pesticides by keeping good records of previous requirements and making good estimates of future needs.
- ◆ End-use label clearly displayed on bulk tanks.
- ◆ Keep an inventory of all pesticides and mark containers with date of purchase. Keep copies of these records in program files.
- ◆ Post warning signs in the area. Use dual language signs if appropriate. Signs should be readable from 50 feet.
- ◆ Valves and lids with capability of being locked.
- ◆ Fill tanks to 95 percent capacity to allow for product expulsion.
- ◆ Do not store clothes, lunches, respirators, or drinks with pesticides.
- ◆ Maintain emergency wash kits (include eyes), and keep spill kits nearby.
- ◆ Keep areas secure from unauthorized personnel.
- ◆ Notify local fire personnel of storage contents and provide an MSDS. Develop a fire pre-plan.

Refer also to **Worksite Organization and Inspection** in the **Program Startup** section.

Bulk Storage Containers

There are many advantages to the use of bulk pesticide storage. The dominant reasons are significant savings in pesticide costs and in container disposal.

When using more than one tank for liquid storage of the same chemical, interconnect them with valved lines so that pesticide can be drawn from any one or a combination of them without moving pump connections from one tank to another. The tanks should be clean and moisture free.

After the pesticide has been delivered, a sample should be obtained from the tank.

Pumping equipment for unloading supply trucks and mixing or recirculation the pesticide should be located so trucks can park out of the way of aircraft being loaded. Aircraft loading equipment should not be used for unloading supply trucks unless this can be done when aircraft are not operating.

Tanks and loading equipment facilities should be located far enough away from the runway to permit aircraft loading without interfering with other aircraft using the runway.

Storage Area Location

Be aware that the FAA Field Servicing District Office (FSDO) has established regulations to prevent obstructing airport runways. There are safety zones around all airport runways called object free areas (OFA's). Therefore, when the storage area is at an airport, avoid placing a berm and tank too close to a runway. Also, consider where aircraft can be loaded safely so not to obstruct other aircraft using the airport. Check with the FAA FSDO about the size of the OFA at the airport and the need to submit a Notice of Proposed Construction or Alteration (FAA Form 7460-1). FAA has a formula to use as a guide, which uses distance from the center line of the runway and the height of the storage tank.

Berming Tanks

Containment berms may be required by local or State pesticide regulators or program guidelines. Also, be aware that many times the diking must be made of a certain material or grade. For example, North Dakota pesticide laws require diking that will hold the volume of the chemical plus 10 percent extra. Materials must be non-absorptive.

Job Aid for Berming Tanks

- ◆ Berm capacity in cubic feet = Berm height (ft) x width (ft) x length (ft)
- ◆ 1.0 cubic foot will hold 7.5 gallons

Example:

- ◆ Chemical ordered is 8,000 gallons
- ◆ Chemical plus 10 percent = 8,800 gallons containment required
- ◆ $8,800 \div 7.5 = 1,173$ cubic feet capacity needed
- ◆ 1.5 ft height x 28 ft width x 28 ft length = 1,176 cubic feet

To make the dike square, use the 3-4-5 construction aid: From a corner, measure 3 feet at the base, then 4 feet up the side. If the corner is square, the hypotenuse will be 5 feet. Adjust the angle of the corner until the hypotenuse is 5 feet.

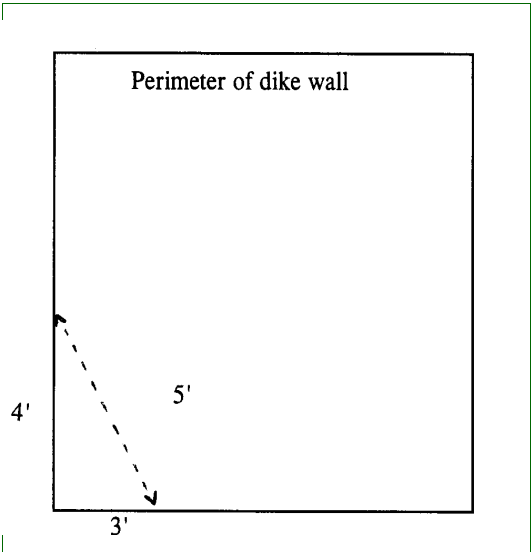


TABLE 2-13-1: Example of a construction aid to make the dike square

3'

Dry Pesticide Formulations

Keep dry pesticide formulations dry. When possible, a hangar, warehouse, other suitable building at the airport, or enclosed van, truck, or trailer should be used for storage. When suitable enclosed storage facilities are not available on or near the loading site, material stored outside of buildings should be stacked on pallets and protected with waterproof covers.

Pesticide Spills

Every pesticide storage site must have an accessible spill kit to contain and clean up accidental leaks or spills.

Contingency plans and procedures for managing spills must be in place in advance of storing pesticides. The contingency plan must also include training on equipment and protocols.

Refer to **Pesticide Spills** in the **Program Supervision** section and to **Appendix C** for additional information.

2

Aerial Application
Manual

Program Planning

Environmental Monitoring

Contents

Introduction [page-2-14-1](#)

Environmental Monitoring Coordinator [page-2-14-1](#)

Introduction

Environmental monitoring may need to be set up at the control block because of program guidelines, NEPA requirements, Environmental Monitoring Plans (EMP's), or because of sensitive areas, site specific conditions, and mitigating circumstances.

Environmental components that are often sampled are: water, sediment, soil, vegetation, target insects, and dyecards.

Most APHIS activities that currently require environmental monitoring are associated with Domestic and Emergency Operations (DEO) programs.

An EMP may also be required for the project based on the program or site specific circumstances.

Information from monitoring documents show that sufficient pesticide reached the target site; off-site pesticide residues were not excessive; the assessment of program risks was accurate; and non-target organisms were not adversely affected.

Environmental Monitoring Coordinator

A cadre of personnel has been trained by APHIS, BBEP, TSS to follow EMP procedures, take appropriate samples, and submit them to the National Monitoring and Residue Lab (NMARL), in Gulfport, MS, for analysis. The cadre has members in each region. Contact the program manager or regional office to determine if environmental monitoring coordinators are required. Additional instructions regarding the need and availability of monitoring personnel, and preparation of an EMP can be handled through:

Leader, Environmental Monitoring Team
USDA APHIS BBEP TSS
4700 River Road, Unit 150
Riverdale, Maryland, 20737-1237
Phone: 301-734-7175
Fax: 301-734-5992

This manual is subordinate to the Environmental Monitoring Plan (EMP) for the program for which the samples are being collected. Any instructions in the EMP supersede instructions contained herein. The EMP will explain what the monitoring is meant to accomplish and how it is to be implemented. Instructions in the EMP concerning implementation will include where samples are to be collected, when they are to be collected, and how many samples need to be collected. Before any environmental monitoring samples are collected, the EMP must be carefully reviewed. If no EMP is available, then Technical and Scientific Services (TSS) at APHIS headquarters (HQ) should be consulted before any samples are collected. TSS at HQ can be contacted at (301) 734-7175. Ask for the Environmental Monitoring Unit.

2

Aerial Application
Manual

Program Planning

Mortality Assessment

Contents

Introduction [page-2-15-1](#)
Determining Number of Sites [page-2-15-1](#)

Introduction

Mortality assessment is conducted in order to determine the effectiveness of the treatment, to document results, and to inform all cooperators.

Official mortality assessment sites are established in the treatment block and are visited before and after treatment operations.

Determining Number of Sites

Based on the delimiting survey, select a number of survey sites to serve as official sample sites for assessing mortality of the control program. The recommended number of sample sites is dependent on the size of the treatment block, available personnel, access to the area, and type of pest being sampled. As much as practical, randomly select the sample sites, which should represent a variety of terrains or habitats within the treatment area in order to provide a more realistic estimate of efficacy. [Table 2-15-1](#) may be useful for certain programs to determine the number of sites necessary. Some program manuals or work unit locations may have established guides for mortality assessment. Mortality assessment may also be accomplished along with normal survey activities.

TABLE 2-15-1: Determine the Minimum Number of Sites to Use for Mortality Assessment

If the number of acres in a treatment block is:	Then the minimum number of sites to use for mortality assessment is:
1,000 to 4,999	5
5,000 to 19,999	10
20,000 to 49,999	15
50,000 to 99,999	20
100,000 and over	20, plus 1 site for every additional 25,000 acres

Mark the mortality sample sites using stakes or flags. Record the location of these sites on the program map that will be part of the program file.

Calculate Percent Control

It is recommended for some projects also to establish mortality sites outside the treatment block. The outside sample sites can provide an estimate of the natural increase or decrease of pest populations in nearby, untreated areas. For example, if populations outside the treatment block remain static or show an increase, then this information would demonstrate to cooperators the success of the control program.

These outside sample sites can be used in a formula to adjust the mortality assessment. The following example uses inside and outside sample sites to adjust the efficacy estimate inside a grasshopper treatment block.

Example:

Grasshopper Densities (square yard) on Sites Inside the Spray Block		Grasshopper Densities (square yard) on Sites Outside the Spray Block	
Pretreatment	Posttreatment	Pretreatment	Posttreatment
93	4	6	6
52	1	36	28
38	1	19	16
22	3	43	32
42	6	9	10
Total 247	15	113	92
Mean <u>92</u>	<u>3.0</u>	<u>22.6</u>	<u>18.4</u>

$$100 \left\{ 1 - \frac{\text{Treated post}}{\text{Treated pre}} \times \frac{\text{Untreated pre}}{\text{Untreated post}} \right\}$$

$$100 \left\{ 1 - \frac{3.0}{49.4} \times \frac{22.6}{18.4} \right\}$$

$$100 \left\{ 1 - 6 \times 1.23 \right\}$$

$$100 \left\{ 0.926 \right\}$$

$$= 92.6 \text{ percent control}$$

Interpret Results

Because the untreated grasshopper population shows a small natural decline during the treatment tomfooleries, the percent control that can be attributed to the grasshopper control treatment also will be reduced or corrected by the formula. Conversely, if the untreated grasshopper population increases after the pretreatment samples are taken, then the formula will show a higher percent control attributed to the treatment.

Sampling the sites in relation to treatment dates is important. Pretreatment samples should be taken as close as practical before treatment begins. When deciding sampling dates for posttreatment counts, consider the type of pesticide that is being used. Chemicals such as malathion have a fast mode of action and posttreatment counts can possibly be taken within a few days after treatment. Chemicals such as carbaryl or bait type formulations have a slower mode of action and will require additional time before maximum efficacy is achieved.

If the rate of mortality is unknown, several posttreatment counts may be needed to ensure accurate data. Allowing adequate time for the chemical to be effective before posttreatment counts are taken will increase the accuracy of mortality assessment. This will also provide a better estimate of program success for cooperators.

Weather conditions also significantly affect accuracy of pest counts. A COR or program manager must balance the optimum weather for pest counts with treatment timing and available personnel.

2

Aerial Application
Manual

Program Planning

Cholinesterase Testing

Contents

Introduction [page-2-16-1](#)
Procedures [page-2-16-1](#)

Introduction

Cholinesterase testing is a way to monitor an employee's level of exposure to two pesticide groups—organophosphates and carbamates. The purpose of the program is to prevent or reduce overexposure to these compounds by monitoring cholinesterase levels contained in the blood stream and taking corrective action.

Appendix B is a reprint of Chapter 7, Section 6, of the APHIS Safety and Health Manual which covers the cholinesterase testing program.

Procedures

Be aware that the latest version of this section contains misinformation. The chapter directs program managers to have the samples submitted to the National Veterinary Services Laboratories. This is no longer the current procedure.

The current procedure is to have the samples submitted to:

Marshall Clinic
c/o Outreach Laboratory
1000 North Oak Avenue
Marshfield, WI 54449-5795
Phone: 800-222-5835

Other information contained in the chapter, such as who needs testing, when to have samples drawn, and symptoms of pesticide poisoning are correct. Make sure you are using the most current version of APHIS Form 29.

Contact your regional Collateral Duty Safety and Health Officer to answer any questions you may have regarding the program and to request a copy of the APHIS Safety and Health Manual.

3

Aerial Application
Manual

Program Startup

Program Orientation

Contents

Introduction [page-3-1-1](#)
Time and Place [page-3-1-1](#)
Checklist [page-3-1-2](#)

Introduction

Once a Contracting Officer's Representative (COR) arrives at a designated location, the program manager is responsible for orienting the COR to specific program operation. This section contains a program checklist that can be used as a model to accomplish this task.

Time and Place

Schedule a meeting with the COR to review program operations.

Brief the COR on completed program activities and program plans. If time does not allow for a one-on-one meeting with the COR, then use the program checklist to gather and document all the information the COR will need to continue with the program.

The following checklist contains items program managers must cover when orienting a COR to control activities. The checklist is also important for program managers and COR's when preparing for startup, supervising, and following up the control activities. The program manager and COR should add additional items to address local or site specific situations.

During the orientation meeting, negotiation must take place between the program manager and the COR on each person's responsibilities or shared responsibilities (**who does what**).

Checklist

1. Have available for the COR the following documents:
 - ☐ Bid Invitation (description)
 - ☐ Contract
 - ☐ Federal prospectus for aerial application
 - ☐ Final Environmental Impact Statement (FEIS) and Environmental Assessment (EA)
 - ☐ Program manual or guidelines
 - ☐ Relevant policy memos
 - ☐ Aerial Application Manual Insecticide labels
 - ☐ Material Safety Data Safety Sheets (MSDS) for chemicals used on the project
 - ☐ Detailed Work Plan (DWP)
 - ☐ Supply of documents and maps COR's and program managers need kept
 - ☐ Spill guidelines, procedures; Federal, State, and local contacts, etc.
 - ☐ Results of cholinesterase testing
2. Have available for the COR, or the COR will provide, information about the following topics:
 - ☐ Delegation of authority to the COR
 - ☐ Program location, size ownership of land, number of spray blocks
 - ☐ Review of the DWP's and maps
 - ☐ Contractor information:
 - reporting date, starting date
 - number and type of application aircraft
 - nozzle type and number
 - number and speed of observation aircraft
 - pumps, meters, and equipment
 - boom timers
 - guidance type and equipment
 - operational hours allowed
 - ☐ Letter(s) of request

- ☐ Cooperator involvement--prior commitments or arrangements with other agencies personnel, State cooperators, land managers, and private landowners
- ☐ Availability of PPQ pilots
- ☐ Airports available, ferry distance
- ☐ Environmental Monitoring Plan
- ☐ Environmental Monitoring Coordinator
- ☐ Pretreatment samples
- ☐ Status of pesticide, storage, and delivery schedule
- ☐ Status of equipment and supplies
- ☐ Presence or absence of organically grown crops in the block and vicinity
- ☐ Presence or absence of biological control sites
- ☐ Bee status
- ☐ Particular safety concerns
- ☐ Environmental concerns:
 - sensitive areas
 - buffer zones
- ☐ Special considerations, such as, change in treatment areas, politics of the area, special interests
- ☐ Contacts (persons, agencies, and phone numbers), such as:
 - State and local cooperators
 - landowners or representatives
 - other Federal agencies
 - airport authority
 - hospital/ambulance
 - fire department
 - police/airport security
 - poison control center
 - State and local emergency offices
- ☐ Motels or lodging facilities available for field surveyors or other personnel who need to stay near the airport or the treatment block

- ☐ Procurement:
 - over-the-counter purchases (VISA, cash)
 - blanket purchase order number(s)
 - accounting classification
 - tax exempt number
- ☐ Names and phone numbers of people supervised by the COR
- ☐ How the program manager will contact the COR
- ☐ How to contact the program manager--frequency, what information to supply for daily report
- ☐ Vehicles/motorcycles/4-wheel ATV's
 - assigned to the COR
 - available for the program (on and off road)
- ☐ Equipment available--what's in storage
- ☐ Need for pretreatment reconnaissance flight
- ☐ Public notice--who to contact, how to contact, shared responsibilities between program manager and COR (who does what)
- 3. Do the following activities during the aerial application program:
 - ☐ Participate with the program manager in an orientation to the control activities
 - ☐ Develop and maintain daily logs recording all actions and events during the program
 - ☐ Prepare daily progress reports for the program manager
 - ☐ Finalize and distribute program maps to the appropriate people
 - ☐ Notify involved agencies, groups, and persons
 - ☐ Send a final notification to beekeepers
 - ☐ Have all equipment and supplies in place and ready for use
 - ☐ Brief program personnel and train them for specific assignments
 - ☐ Become familiar with the treatment areas and inspect them for hazards and sensitive areas
 - ☐ Conduct reconnaissance flight, check boundary flagging, buffers, check for bees
 - ☐ Jointly sign and date the master program map with pilot to verify spray block, sensitive areas, and buffer zones

- ☐ Inspect pilot documents and each aircraft and its dispersal apparatus to determine compliance with contract specifications

If the pilot or aircraft does not comply with the specifications of the contract, then stop the contractor from taking further action and contact the contract officer in Minneapolis to ask for additional instructions.

- ☐ Brief contractor personnel
- ☐ Inspect the work site with the contractor or the contractor's representative
- ☐ Obtain a reference sample of the pesticide
- ☐ Ensure that the regional, environmental monitoring contacts have been notified of the program and are ready to conduct the necessary environmental monitoring
- ☐ Ensure adequacy of radio communications, within the block and to the airstrip (reiterate radio protocols)
- ☐ Determine daily startup
- ☐ Arrange and document mortality assessment sites
- ☐ Monitor safety concerns
- ☐ Monitor weather conditions
- ☐ Monitor dye cards
- ☐ Implement an environmental monitoring plan
- ☐ Provide feedback to local representatives of interested State and Federal wildlife agencies, if requested
- ☐ Aerially observe control activities
- ☐ Provide program updates
- ☐ Conduct daily briefing
- ☐ Determine shutdown of the daily activities
- ☐ Maintain current master program map illustrating daily progress in application
- ☐ Ensure that the timekeeper properly completes PPQ Form 802, Daily Aircraft Record

- ☐ Monitor contractor personnel ensuring that they are complying with contract provisions
 - spray activities
 - airport/airstrip activities (insure permission for use of airport, fees paid)
 - personnel
 - aircraft/equipment
- ☐ Brief program personnel on measures to extend courtesy to local townsfolk (what to say/not say at the cafe, noise at the motel at 0400, etc.)
- ☐ Respond to complaints
- ☐ Manage and contain pesticide spills
- 4. Do the following activities after completion of the program:
 - ☐ Follow up on all unresolved complaints
 - ☐ Inform involved agencies, groups, and persons that treatment is completed
 - ☐ Account for all equipment and chemical
 - ☐ Dispose of empty containers
 - ☐ Document/record program costs such as, salary, per diem, fuel, repairs, rentals, purchases
 - ☐ Make financial settlement with cooperators and prepare a financial summary
 - ☐ Remove boundary markers upon program completion
 - ☐ Interview private cooperators to determine quality of project
 - ☐ Prepare a Work Achievement Report, and any other required report documenting results of the program
 - ☐ Complete PPQ Form 817, Aerial Contractor Performance Evaluation Report and forward to the program office
 - ☐ File records of the program
 - ☐ Critique the program

3

Aerial Application
Manual

Program Startup

Daily Log and Base Log

Contents

Introduction	page-3-2-1
Purpose	page-3-2-1
Daily Log	page-3-2-2
Base Log	page-3-2-5

Introduction

Two types of logs are necessary to maintain the project file. The daily log is kept by COR's and program managers before and during projects, and base logs are kept by timekeepers or airport supervisors.

The daily log and base log are used to record all pertinent information related to program administration, supervision, and operations. These documents must be a clearly and accurately written account of events and details in chronological order. Logs must be maintained as part of the program file.

Purpose

Program logs serve many functions including:

- ◆ Reference material for future program managers for planning
- ◆ Useful for COR's when setting up and supervising programs
- ◆ Reviewing procedures
- ◆ Historical record
- ◆ Used to settle disputes (formal and informal)
- ◆ Action taken
- ◆ Useful to make settlements or adjustments to the contractor
- ◆ Providing information to State or local pesticide regulatory officials

The following log entry items are listed for daily and base logs. If only one log can be kept, items from both lists need to be combined. To avoid duplication of effort or redundancy, the program manager or COR could decide only to summarize activities not specifically substantiated by other reports such as the base log. If the COR ensures that the airport recorder keeps certain information in the base

log, the daily log may be more specific to actions taken or decisions made. Persons recording information in the daily and base logs should be coordinated to avoid duplication but also to avoid missing the entry of important information into a log.

If the COR is in charge of more than one airstrip, the COR could compile the total end of day activities from the base logs.

Daily Log

Items to Record on the Daily Log Before Spraying Begins:

1. Date and time of COR's arrival on site
2. Details discussed during the orientation with the program manager
 - A. The orientation checklist could fulfill this information. Include notes on extra items added to the list and other notes taken by the COR.
3. Inventory of equipment on site

Items to Record on the Daily Log Before Spraying Begins (continued)

4. All groups and persons contacted and the information exchanged. These groups and persons include:
 - A. program manager
 - B. landowner committee chairman
 - C. landowners
 - D. Federal land managers
 - E. county extension agent
 - F. State cooperators
 - G. contractor
 - H. PPQ, State, and other program personnel
 - I. airport authority
 - J. hospitals
 - K. police
 - L. fire department
 - M. company supplying the pesticide
5. Purchases of equipment and supplies
6. Names, dates, and arrival times of all support personnel

7. Dates, places, times, and subjects of meetings with:
 - A. contractor
 - B. State cooperators
 - C. Federal land managers
 - D. private landowners
 - E. public
 - F. others
8. Date and time of arrival of aircraft, numbers (aircraft)
9. Date and time of acceptance of pilots and aircraft
10. All complaints and comments from (include action taken):
 - A. contractor
 - B. State cooperator
 - C. Federal land managers
 - D. private landowners
 - E. public
 - F. others
11. Problems encountered including:
 - A. aircraft not reporting
 - B. contractor lacking documents
 - C. shortages or inadequate equipment
 - D. pilots not showing up on time on spray days

Items to Record on the Daily Log During the Spray Program

1. Date
2. Time
3. Weather conditions:
 - A. wind
 - B. temperature (air and ground)
 - C. cloud cover
4. Time aircraft are airborne
5. Time and reason for non operational aircraft
6. Time and reason for aircraft returning to base
7. Contractor actions.
8. Phone calls and subject

9. Visitors (name and purpose of visit)
10. Complaints and action taken
11. Conversations and meetings
12. Pesticide spills at base
13. Time and reason for stopping spray operations
14. Number of gallons of pesticide used (from Daily Aircraft Record, PPQ Form 802)
15. Number of acres sprayed (calculated from master program map)
16. Number of gallons of pesticide used (calculate from boom timers)
17. Mortality information from treated areas
18. Time base closed

Occasional Events or Items to Record as Needed in the Daily Log

1. Pesticide dumped from the aircraft:
 - A. date
 - B. time
 - C. aircraft number
 - D. reason for dump
 - E. amount of pesticide dumped
 - F. exact location
 - G. persons notified
 - H. action taken
2. Aircraft accident:
 - A. date
 - B. time
 - C. aircraft number
 - D. reason (if known)
 - E. amount of pesticide aboard the aircraft
 - F. exact location
 - G. action taken
3. Vehicle accidents:
 - A. date
 - B. time
 - C. license plate number

- D. reason (if known)
 - E. name(s) of person(s) involved and extent of injuries
 - F. Statement made by witnesses
 - G. action taken
4. Personal injuries:
- A. date
 - B. time
 - C. names of injured and extent of injuries
 - D. cause of injuries (if known)
 - E. statements or comments from witnesses
 - F. action taken

Base Log

Items to Record in a Base Log Before Spraying Begins

The following information is recorded in the base log by the COR until an airstrip supervisor or timekeeper is assigned to maintain the base log.

- 1. Date airstrip was selected
- 2. Location (city and county)
- 3. Date the base was established
- 4. Pesticide information:
 - A. arrival date
 - B. method of shipment (in bulk, barrels, bags etc.)
 - C. total amount of pesticide delivered
- 5. Pesticide storage:
 - A. warning signs posted on drums or tanks
 - B. locks on tanks
 - C. status of security in the area
- 6. Inventory of safety equipment and spill kit on site:
 - A. date, time, and attendance of safety training
- 7. Contractor information:
 - A. arrival date
 - B. arrival time

- C. aircraft (identification numbers and make and model)
- D. vehicles
- E. support personnel (loaders, mechanics)
- F. equipment (pumps, hoses, meters)
- 8. Inspections of aircraft and documents (date and time)
 - A. determine that contractor is licensed to work in your State
 - B. determine that contractor is licensed to apply pesticides in your State
- 9. Review of pilot certificates, insurance, and documents (date and time)
- 10. Meetings (date and time)
- 11. Agreed upon daily starting time

Items to Record in Base Log During the Spray Program

The following information is recorded in the COR's base log beginning on the first spray date.

- 1. Date
- 2. Time
- 3. Weather conditions:
 - A. wind
 - B. temperature (air and ground)
 - C. cloud cover
- 4. Time aircraft are airborne
- 5. Time and reason for aircraft returning to base
- 6. Time and reason for non operational aircraft
- 7. Phone calls
- 8. Visitors (name and purpose of visit)
- 9. Complaints:
 - A. persons name making complaint
 - B. phone number to contact person
 - C. nature of complaint
 - D. action taken
- 10. Conversations and meetings
- 11. Pesticide spills at base and action taken
- 12. Supplies used or reordered

13. Time and reason for stopping spray operations
14. Number of gallons of pesticide used (from PPQ form 802)
15. Number of acres sprayed (calculated from master program map)
16. Time base closed

Occasional Events of Items to Record as Needed in the Base Log

1. Pesticide dumped from aircraft:
 - A. date
 - B. time
 - C. aircraft number
 - D. reason for dump
 - E. amount of pesticide dumped
 - F. exact location
 - G. persons notified
 - H. action taken
2. Aircraft accident:
 - A. date
 - B. time
 - C. aircraft number
 - D. reason (if known)
 - E. amount of pesticide aboard the aircraft
 - F. exact location
 - G. persons notified
 - H. action taken
3. Vehicle accidents:
 - A. Record all information reported to the base
4. Personal injuries:
 - A. Record all information reported to the base

3

Aerial Application
Manual

Program Startup

Program Maps

Contents

Introduction [page-3-3-1](#)
Source of Maps [page-3-3-1](#)
Information to Record [page-3-3-1](#)

Introduction

Accurate maps are essential aids for planning field work, orienting scouts and pilots, locating electronic guidance tower sites, and graphically recording the acreage treated each day.

The best type is a topographic map. Advantages of using a topographic map include:

- ◆ Areas can be calculated with a planimeter
- ◆ Many are shaded to indicate woodlands
- ◆ Treated areas can be checked accurately against the amount of pesticide applied
- ◆ Contour lines and other pertinent information shown on them provide good references for the pilots
- ◆ Program personnel can record exact locations where swaths or a day's work ended

Source of Maps

Topographic maps are identified by indexes issued for each State. Copies of State indexes and information concerning availability of maps can be obtained from the U.S. Geological Survey. These and other maps may also be available at State Geological Surveys or State water commissions.

Information to Record

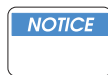
A master map with an appropriate scale should be used for each unit to show the perimeter of the area(s) to be treated. On it should be shown:

- ◆ Location of the airstrip

- ◆ Treatment blocks
- ◆ How the area has been divided and numbered
- ◆ Acres in each block
- ◆ Amount of pesticide needed for each block
- ◆ Areas not to be treated
- ◆ Hazards to pilots
- ◆ Highlighted endangered species areas and buffer zones

Provide for each airstrip supervisor and scout a suitable map showing all information listed above. If a unit is too large to be shown on one map, several maps should be joined together.

Also provide each pilot with this information on a map of the same scale, showing only the block assigned to him for treatment plus a surrounding border a few miles wide. A map of the whole unit may be too cumbersome to handle in the cockpit.



When drawing, block boundary lines on a map, draw the lines adjacent to roads, pipelines, power lines, etc., so as not to hide the boundary reference on the map. It is also helpful to number corners, and name features to aid in communication with program personnel.

Refer to **Program Maps** in the **Program Planning** section.

3

Aerial Application
Manual

Program Startup

Equipment and Supplies

Contents

Introduction [page-3-4-1](#)

Job Aid [page-3-4-1](#)

Small Purchases and Use of the Commercial Credit Card (Currently VISA) [page-3-4-2](#)

Introduction

Predicting shortages of equipment and supplies in advance is important for the smooth operation of a program.

Job Aid

The following job aid may help determine the amount of supply to order or keep on hand.

1. Determine the amount of supply on hand.



Initial amount (i) minus the total amount used (t) should equal the actual amount on hand (a).

$$i - t = a \quad a. \underline{\hspace{2cm}}$$

2. Determine the average rate of use of the item per day (b). b.

3. The amount on hand (a) divided by the average rate of use per day (b) equals the number of days the supply will last (c).

$$a \div b = c \quad c. \underline{\hspace{2cm}}$$

4. Approximate number of days left to complete the program (d). d.

5. If the number of days the supply will last (c) is less than the number of days left to complete the spray program (d), **THEN INFORM THE PROGRAM MANAGER OF THE POTENTIAL SHORTAGE.**

_____ If (c) is less than (d), inform the program manager of shortages.

_____ If (c) is greater than (d), supplies are adequate.

6. Continue to monitor the rate of use and determine the reason for any significant change.

Small Purchases and Use of the Commercial Credit Card (Currently VISA)

Small purchases are made by the Government to buy supplies, personal property, personal and non-personal services without formal advertising. Minor construction, repairs, and changes to buildings are included in small purchases; so are rental of vehicles, aircraft and equipment. This program is extremely helpful to program managers and COR's when conducting and supervising aerial programs. Holders of the credit card will be able to obtain needed supplies or services from vendors in a cost effective manner. It has replaced the use of AD 744 which has been discontinued.

Chapter 10 of the USDA Acquisition Handbook covers policy, authorities, and responsibilities of the Commercial Credit Card Program.

In accordance with USDA Departmental Regulation 5013-1, Commercial Credit Card

Program, all VISA cardholders and approving officials must successfully complete 8 hours of small purchase training before a credit card can be issued. If you have not completed the required training, you can either complete the USDA Small Purchase Self Study Course or obtain training from an approved training source.

Taking the course for VISA holders may not be enough to direct a cardholder. You must be aware what can't be done with the card. Be aware that regional office guidelines on the use of the VISA card may be more restrictive than rules established by the Field Servicing Office (FSO) in Minneapolis.

To apply for a VISA card and the self study course, fill out the application form (see **Figure 3-1**) and submit it to the APHIS Regional Office Approving Official for credit card purchases. That person (Approving Official) will forward the request to USDA, MRP Business Services.

All credit card correspondence to USDA, MRP Business Services should be directed to:

USDA, MRP Business Services
Account and Property Services
Butler Square, 5th Floor
100 N. 6th Street
Minneapolis, MN 55403
Phone: 612-370-2499

APPLICATION FOR THE COMMERCIAL CREDIT (VISA) CARD

You must have successfully completed at least 8 hours of Small Purchase Self Study Course or VISA credit card training to obtain the card. Attach your certificate of training or other proof of training with this completed application and submit it to:

USDA, MRP BUSINESS SERVICES
Attn: Megan Phommahaxay
Butler Square, 5th Floor
100 North Sixth Street
Minneapolis, MN 55403

- | | |
|---|-----------------------|
| 1. Name of Cardholder | 2. Position Title |
| 3. Mailing Address | 4. Office Telephone |
| 5. Single Purchase Limit | 6. Monthly Limit |
| 7. Complete 8 hours of Small Purchase Training? | Yes _____ No _____ |
| 8. Name of Approving Official? | 9. Position Title |
| 10. Approving Official's Address | 11. Telephone Number |
| 12. Cardholder's Signature | 13. Date of Signature |
| 14. Approving Official's Signature | 15. Date of Signature |

FIGURE 3-4-1: Sample of an Application for the Commercial Credit (VISA) Card

3

Aerial Application
Manual

Program Startup

Radio Communications

Contents

Introduction	page-3-5-1
Authorization	page-3-5-1
Radio Operator's License	page-3-5-2
Distress and Emergency Procedure	page-3-5-2
Equipment Descriptions	page-3-5-2
Base Stations	page-3-5-3
Base Station Antenna	page-3-5-3
Mobile Radios and Antennas	page-3-5-3
Portable Radios (Hand Held)	page-3-5-3
Determining Radio Equipment Needs	page-3-5-3
Batteries for Portable Radios	page-3-5-4
Operation of Radios	page-3-5-4
Messages	page-3-5-5
Use of Codes	page-3-5-5
Ten Code	page-3-5-5
Seven Code	page-3-5-6
Cellular Phones	page-3-5-7

Introduction

Communication between program personnel is critical for the successful execution of aerial application projects. Effective communication will increase efficiency, avoid mistakes, and reduce final costs. This section contains basic information that program managers and COR's may use to set up an effective two-way radio communications system. Additional information can be found in the Two-Way Radio Communication Operation Manual (807-58) dated May 1971.

Currently, there is a task force reviewing radio systems used throughout the agency for various programs. As a result of this review, a new protocol may be established for the frequencies used for two-way radio communications.

Authorization

The Interdepartmental Radio Advisory Committee (IRAC) has assigned a frequency, 171.525 MHz, to Plant Protection and Quarantine for its use throughout the United States. The operation of agency radios is authorized and governed by regulations of the Federal Communications Commission (FCC) and IRAC.

Radio Operator's License

A radio operator's license is not required to operate a Federal Government radio. The only authorized users of Federal Government radios are program personnel or cooperators. The operation of two-way radio equipment puts a responsibility on each user. FCC regulations prohibit the use of profane or indecent language on radio transmissions and limit communication to business related to official Government operations.

Distress and Emergency Procedure

A good radio communications system is an important part of a work unit's safety program. Survey scouts, ground observers, and other program personnel often work in remote areas and in harsh conditions. A communications system is critical in the event of an injury, vehicle breakdown, aircraft crash, or other accidents.

"Mayday" is the international radio-telephone distress signal. Distress messages have priority. If a serious emergency arises, the word "Mayday" should be repeated several times prior to transmitting the message. All other stations on the frequency should immediately terminate any transmission they may be making and standby to assist if the need arises.

Equipment Descriptions

The following are brief descriptions of various radio equipment types.

Communications Distance and Repeaters

The distance over which communication may be conducted, ground to ground, with an agency radio is roughly comparable to "line of sight." It is therefore important that the antenna be placed as high as practicable above the ground or that the radio be operated from the highest point in the immediate area. In some instances, ground to ground communication may be greatly improved if the radio location is moved only a short distance.

Use of radio equipment can be greatly increased, especially in hilly or mountainous terrain, by using a third party to relay messages. In practice, this can be either a ground repeater station located at a higher elevation or an airborne radio in an observation aircraft. Use of a repeater station will require programming all units to accommodate a repeater channel.

Base Stations

When it is planned to operate a program in a given area for an extended period of time, it is advisable to establish a permanent or base station. These cabinet or tabletop radios are sometimes more powerful than mobile radios and may improve communications.

Base Station Antenna

A good antenna, mounted as high as possible, will improve communication and increase the area that can be covered. Installation should be performed by a knowledgeable technician. Proper installation would include lightning safety and marking support lines. Antennas installed at airports should be located so it will not create a hazard to aircraft.

Mobile Radios and Antennas

Installation should be performed by a knowledgeable technician for best performance. The antenna should be placed as close to the center of the roof as possible. Gutter mount antennas are adequate for temporary use but may not perform as well as centered antennas. Magnet mount antennas are very useful for temporary installation such as in a rented vehicle. These types of antennas may fall off or slide on the roof at highway speeds.

Portable Radios (Hand Held)

These radios are complete and compact for two-way communications. They have a built in microphone and speaker, antenna, and carrying case. They operate from rechargeable batteries or power cords that may be plugged into a vehicle cigarette lighter. These radios are extremely portable and useful but have a shorter transmitting range. As with other radios, they will perform better on high locations away from obstructions.

Performance of these radios may be increased by the use of an outside mounted antenna. Consult the operators manual or a qualified technician to make sure using this type of antenna will not damage the unit.

Determining Radio Equipment Needs

As a guide to establishing the number and types of radios needed for conducting an aerial application program, the following may be helpful. The actual two-way system established will depend on local conditions and special needs.

- ◆ For each airport - one base or mobile radio with mast and antenna.

- ◆ For each treatment block - at least one mobile radio during operations.
- ◆ For each supervisor - one mobile and one hand held radio.
- ◆ For each flagman - one mobile and one hand held radio.
- ◆ For each ground observer - one mobile and one hand held radio.
- ◆ For each aerial observer - one hand held radio with extra batteries or power cable to connect to a cigarette lighter. An alternative would be one mobile radio per observation aircraft.



When a radio is connected to the aircraft electrical system for power, the connection must be made only by the contractor or their representative, never by anyone else. This would also include the installation of a temporary outside antenna on the aircraft.

Each observer should also have a special headset and a remote noise-canceling microphone connected to the portable radio for better hearing and voice transmission from a noisy aircraft cabin.

All portable units should include a charger. Extra batteries also may be needed if the radio is used frequently or over a longer period of time.

On large programs where an operations office may be set up at a location other than an airport, another base radio with antenna also would be required.

Batteries for Portable Radios

The rechargeable nickel-cadmium type batteries will give a long life if properly recharged. Consult the operators manual for proper recharging procedures. Some batteries should be drained completely before recharging while others can be recharged at anytime. Some batteries can also damaged if left in the charger too long. Extra batteries may be needed when using a portable radio frequently or over an extended work day.

Operation of Radios

General use of an individual model and its features are described in the operators manual. Installation should be made by a qualified technician. Before daily operations, check cable connections, fuses, and bolted connections for proper installation and tightness. A radio communications check should be made between all program personnel including the aerial observer prior to beginning daily operations.

Messages

Only one person at a time can speak on a frequency. You must wait your turn when sending messages. Do not depress a microphone button when somebody else is using the channel. This will cause the message to be blocked.

All radio messages, conversations, or communications must be clear, to the point, and as brief as possible. Personal messages or messages not related to the project operations are not authorized.

When communication is completed, hang the microphone in the bracket, so there is no chance of the push-to-talk button being accidentally depressed and blocking the channel.

When attempting to send a message, state the person's name or code number first; then state your name or code number last. This way the person's attention will be gained and will be listening for the name of the person calling.

Develop a plan for program personnel that details what information will be communicated to whom. Establish an alternative way to communicate if a radio fails. An example would be if a ground observer needs to stop an aircraft from treating an area that should not be treated. If a radio has failed, a backup signal, such as waving a red flag, would signal the pilot to stop spraying.

Use of Codes

To facilitate the use of radios and make all communications as brief as possible, a system of code numbers has been worked out that will permit certain form questions or replies to be made by merely transmitting two numbers. The code, known as the "Ten Code" has been used universally by police, fire departments, and many other two-way radio operators throughout the United States.

Those parts of the "Ten Code" which may be useful in the operation of the agencies radios are listed below. They should not be changed.

Program managers or COR's should determine which (if any) of the codes will be used on the project. The use of the codes should be discussed with all program personnel during the briefings.

Ten Code

- ◆ 10-1 Receiving poorly
- ◆ 10-2 Receiving well

- ◆ 10-3 Stop transmitting
- ◆ 10-4 I have received and understand your message
- ◆ 10-5 Verbal repeat
- ◆ 10-6 Standby (will call)
- ◆ 10-7 Out of service (radio turned off or away from radio)
- ◆ 10-8 In service
- ◆ 10-9 Repeat beginning with _____
- ◆ 10-11 Slow up (talking too fast)
- ◆ 10-20 What is your location
- ◆ 10-25 Do you have contact with _____

In addition, a “Seven Code” has been developed specifically for messages associated with APHIS aerial programs.

Seven Code

Weather Conditions:

- ◆ 7-1 Too windy or turbulent to work
- ◆ 7-2 Fog or rain in the area (identify, if necessary)
- ◆ 7-3 Shut down - pesticides drifting or rising
- ◆ 7-4 O.K. to work

Aircraft Spray System: When referring to a specific aircraft, identify it by name or number.

- ◆ 7-5 Dispersal system leaking
- ◆ 7-6 Releasing material en route to area or during turnaround
- ◆ 7-8 Plugged nozzles or gate not opening
- ◆ 7-9 Hold on ground until I get there

Pilot Performance: Identify by name or aircraft number.

- ◆ 7-11 Aircraft too high
- ◆ 7-12 Too low
- ◆ 7-13 Swath spacing too wide
- ◆ 7-14 Swath spacing too narrow
- ◆ 7-15 In wrong area

Cellular Phones

Cellular phones are other extremely useful tools that may help in program operations. Temporary or permanent cellular service should be considered to increase communication capabilities outside the range of mobile radios or on site personnel. Cellular phones also are an important safety tool especially for emergencies in remote areas.

As with mobile radios, the use of cellular phones are restricted to official Government business.

3

Aerial Application
Manual

Program Startup

Safety

Contents

General Precaution	page-3-6-1
Introduction	page-3-6-1
Handling Pesticides	page-3-6-2
Labels	page-3-6-2
Material Safety Data Sheet (MSDS)	page-3-6-2
PPQ Manuals	page-3-6-2
Memorandums and Directives	page-3-6-3
Emergency and Information Services	page-3-6-3
Pesticide Manufacturers	page-3-6-3
The Standard Pesticide User's Guide	page-3-6-3
State and Local Agencies	page-3-6-3
Personal Protection	page-3-6-4
Sources of Information	page-3-6-4
General Rules to Follow for Personal Protection	page-3-6-4
Vehicle Safety	page-3-6-5
Guidelines for Working Safely Around Aircraft	page-3-6-5
Working Safely Around Fixed-Wing Aircraft	page-3-6-6
Working Safely Around Helicopters	page-3-6-7
Pesticide Spills and Accident Contingency Plan and Emergency Contacts	page-3-6-8
Work Unit Hazard Information	page-3-6-9

General Precaution

The information in this subsection is reprinted, in part, from the APHIS Pesticide Certification Training Materials.

Introduction

The safety procedures presented in this subsection are not intended to limit program activities. Rather, use the procedures to develop a safety program given special circumstances encountered in each work unit. Contingency plans for emergency response should be developed for aerial and ground spraying programs.

Handling Pesticides

The safe handling of pesticides pertains to any pesticide or insecticide. However, the exact procedures to follow are determined by the type and amount of pesticide, and the Federal, State, and local regulations that apply. Therefore, knowing where to find the appropriate information or who to contact is crucial to safely handling pesticides.

Labels

Always read the label first. The label includes specific instructions for applying the pesticide, describes the type of protective equipment that must be worn, and states the environmental hazards that must be avoided. Directions for storage and disposal are also included. Instruction for transporting the pesticide may or may not be present.

Many manufacturers include on the label phone numbers for emergency first aid and general product information. Make sure the label being used is current.

Material Safety Data Sheet (MSDS)

An MSDS provides information about a particular pesticide. The sheet describes the chemical and physical properties of the pesticide. The requirements for protective equipment are explained in detail. Complete information relating to fire hazards and fire fighting procedures are given. Storage, disposal, decontamination, and spill procedures are included. Also, an MSDS usually contains information about transporting the pesticide. An MSDS for each chemical in use must be on file and made available to employees upon request.

PPQ Manuals

The General Operational Procedures Manual, M390, contains two parts that cover managing pesticide spills and monitoring the impact of application.

- ◆ M390.1402, “PPQ Guidelines for Managing and Monitoring Pesticide Spills.” This manual part provides guidelines for preparing spill kits, contingency planning for spill, procedures to follow if a spill occurs, who to contact, and procedures to follow after a spill.
- ◆ M390.1403, “Collecting Environmental Monitoring Samples.” This manual part describes the procedures for collecting and handling samples for environmental monitoring. A special cadre of personnel has been established for collecting environmental samples. Refer to the subsection **Environmental Monitoring** in the **Program Planning** section.

Memorandums and Directives

PPQ and APHIS issue and distribute memorandums and directives informing personnel of changes in pesticide regulations, or establishing or clarifying policies and procedures. The information contained in these documents will usually be incorporated into the appropriate operational manual or its supplement.

Emergency and Information Services

The CHEMTREC Center is a source of emergency assistance for incidents involving the transportation of pesticides. It operates 24 hours a day. The toll-free number is 1-800-424-3900.

The National Pesticide Telecommunications Network (NPTN) is another 24 hour service that provides accurate and prompt information to anyone, whether or not an emergency exists. Information includes pesticides product information, toxicology reviews, safety and health information, environmental effects, and cleanup procedures. The toll-free number is 1-800-858-7378 (in Texas, the number is 806-743-3091).

Pesticide Manufacturers

Pesticide manufacturers often provide their own phone numbers for emergencies or general product information. The phone numbers are located on the label, MSDS, or in product reference materials.

The Standard Pesticide User's Guide

The Standard Pesticide User's Guide is a book by Bert L. Bohmont that contains glossaries, illustrations, and general factors to consider when using any pesticide. This user guide should be part of every work unit's reference materials.

State and Local Agencies

The procedures described on a label and an MSDS are often followed by statements such as, "... or in a manner approved by State and local authorities." This is a reminder that State, local, and Tribal laws must always be considered when handling pesticides.

A list of State Pesticide Control Offices is found in Appendix D in the Standard Pesticide User's Guide.

Personal Protection

Sources of Information

Information on personal protection can be found in the same references that provide pesticide handling procedures. These sources include labels, the Standard Pesticide User's Guide, emergency and information services, and Agency memorandums, directives, and manuals.

The APHIS Safety and Health Manual contains several sections that are related directly to pesticide safety.

Chapter 11 of the Safety and Health Manual is entitled, Personal Protection. Section 1 deals with personal protective equipment. Section 3 explains the APHIS respirator program guidelines. Section 4 explains the APHIS contact lens policy.



Contact lenses cannot be worn where there is possible exposure to pesticides.

Chapter 7 is entitled, Occupational Health. Section 7 deals with the cholinesterase testing program. The purpose of the program is to monitor cholinesterase levels in the blood of individuals exposed to carbamates and organophosphates.

Other excellent sources of information can be obtained from the PPQ Treatment Manual, the APHIS Safety and Health Environmental Staff (film library), the Red Cross, and Poison Control centers that are located throughout the United States.

General Rules to Follow for Personal Protection

- ◆ Avoid breathing a spray mist or fine airborne particles. Test fit respirators.
- ◆ Use eye goggles with chemical vents, not slots. Use a non-absorptive headband.
- ◆ Do not take pesticides internally.
- ◆ Avoid pesticide contact with eyes, skin, or clothing. Wear pants outside of your boots.
- ◆ Wear long-sleeved work clothing and head covering during aerial applications.
- ◆ Change daily to clean clothing.
- ◆ Launder contaminated clothing with hot water before wearing again and wash separately from other clothing. Use the longest wash cycle.

- ◆ Use of starch will help trap pesticides. The starch and pesticide wash away with the next laundering.
- ◆ Leather watch bands, boots, and gloves cannot be decontaminated.
- ◆ Do not eat, drink, or use tobacco while working with a pesticide.
- ◆ Wash hands and face before eating, drinking, or using tobacco.

Vehicle Safety

The following rules should be observed to avoid accident or injury when operating vehicles.

- ◆ Check the condition of the vehicle before starting daily activities.
- ◆ Check to see that the passage is clear before backing up the vehicle.
- ◆ Select a safe parking place for the vehicle while surveying or when leaving the vehicle.
- ◆ Drive slowly when roads are unfamiliar, winding, unpaved, wet, or icy.
- ◆ Always use seat belts.
- ◆ Obey the posted speed limits. **DON'T SPEED!**
- ◆ Keep the vehicle free of debris and unsecured items.
- ◆ Immediately tell the supervisor whenever the vehicle being driven is involved in an accident.
- ◆ Carry wooden blocks to block the tires when parking on a steep slope.
- ◆ Carry sufficient repair tools (jack and lug wrench) and safety equipment (fire safety, first aid manual and kit, reflector warning device) and other equipment as conditions warrant or required by the work unit.
- ◆ Park vehicle on a flat surface, and block wheels when changing a flat tire.
- ◆ Do not get under a vehicle that is up on a jack. Keep arms and legs clear in case the vehicle falls off the jack.

Guidelines for Working Safely Around Aircraft

The following guidelines will help prevent accident or injury when working around aircraft:



Failure to follow these guidelines will result in severe injury or death!

- ◆ Wear personal protective equipment.
- ◆ Keep all unauthorized personnel away from the aircraft at all times.
- ◆ Keep all unauthorized personnel away from the area where pesticides will be loaded or stored.
- ◆ If the aircraft's engines are running, stay at least 100 feet away.
- ◆ Never smoke within 50 feet of the aircraft.
- ◆ Never fuel the aircraft.
- ◆ Never load the aircraft.
- ◆ Never work on the aircraft.
- ◆ Stay away from aircraft propellers and helicopter blades.
- ◆ Tell the pilot of any obstacles.

Working Safely Around Fixed-Wing Aircraft



Failure to follow these guidelines will result in severe injury or death!

- ◆ If the aircraft's engine is running, never walk in front of it.
- ◆ If you need to approach an aircraft while its engine is running, approach only from the side or rear.
- ◆ If you need to talk to the pilot who's seated in the aircraft and not looking at you--approach the aircraft from the side or rear only.
- ◆ If you need to get the pilot's attention, move the aileron up and down. Once you have the pilot's attention, approach the aircraft cautiously from the back side of the wing only. Avoid the wind blast from the spinning propeller.
- ◆ Always maintain a safe distance from the aircraft's engine--even when it's not running.
- ◆ Never put your hand on the propeller. The slightest movement of the propeller could cause the engine to start.

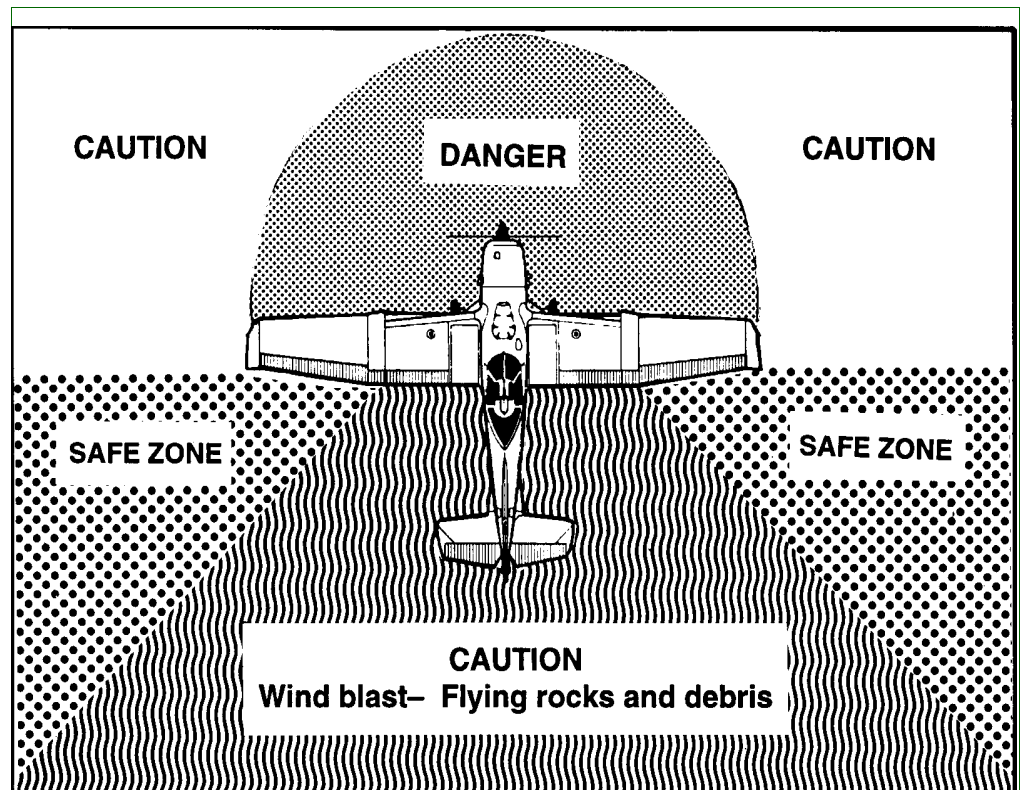


FIGURE 3-6-1: Safety around fixed-wing aircraft

Working Safely Around Helicopters



Failure to follow these guidelines will result in severe injury or death!

- ◆ If the helicopter's engine is running, never walk behind it.
- ◆ Approach a helicopter only from the front, and then, only if the pilot sees you and motions you to proceed.
- ◆ Leave a helicopter only from the front or side as shown in the **Figure 3-6-2**.

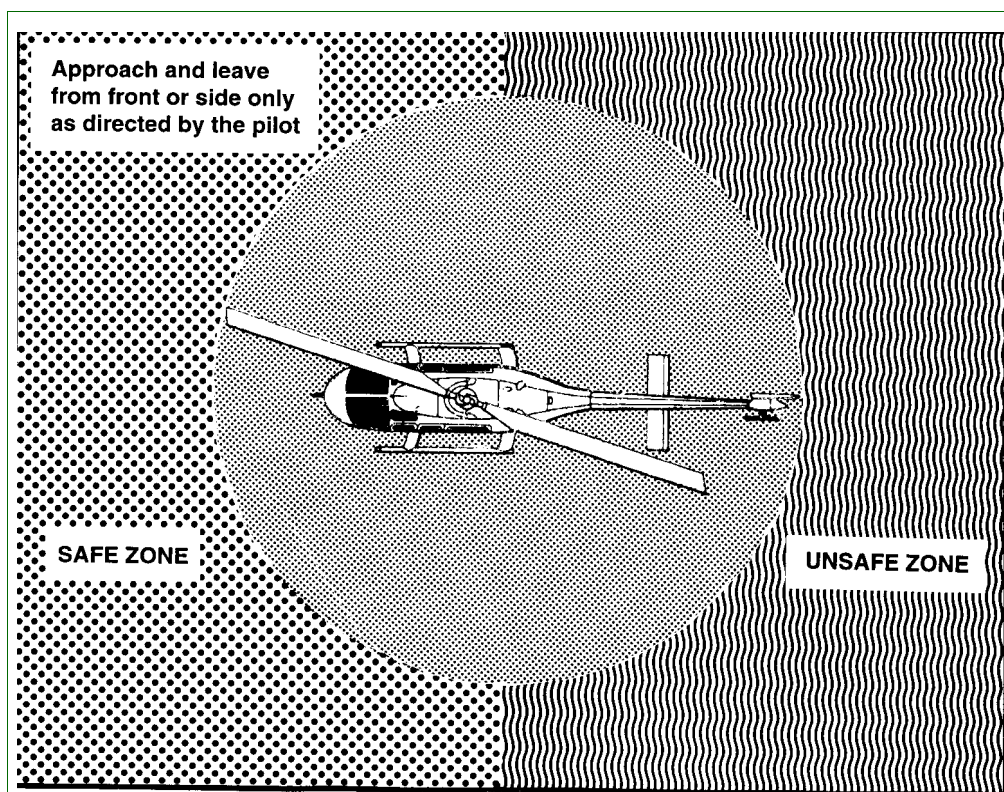


FIGURE 3-6-2: Safety around helicopters

Pesticide Spills and Accident Contingency Plan and Emergency Contacts

Each work unit should develop a contingency plan in the event of a pesticide spill or accident. Develop an information sheet that can be distributed to COR's or other personnel as they arrive on site. The pesticide spill and accident information sheet should contain names, phone numbers, fax numbers, and addresses. Information will vary from State to State. In addition to local and site specific needs, the following contacts should be listed on the sheet. After completing this information, place a copy in Appendix 3 which is reserved for this information:

- ◆ State plant health director (include home phone)
- ◆ State pesticide enforcement official
- ◆ Appropriate Tribal Agency
- ◆ Regional office of the Environmental Protection Agency (EPA)
- ◆ Riverdale DEO staff
- ◆ Regional office (include home phone numbers)
- ◆ CHEMTREC (use if spill occurred during transportation)

- ◆ Local poison control center
- ◆ Local fire department
- ◆ Local hospital
- ◆ Local ambulance
- ◆ Local police department
- ◆ Pesticide monitoring lab

Work Unit Hazard Information

Permanent and temporary employees in the work unit should receive safety training as necessary to perform required tasks in a manner that does not cause risk of injury to themselves or others. People who are on a temporary assignment to your work unit should also receive appropriate safety information or training.

Each work unit should develop a checklist of topics to cover during the safety training session. Each work unit will need to tailor the training to suit specific tasks or unique issues. Consider making the checklist a form that can be signed by the participants. This will provide a record of training that can be used to plan refresher or future training schedules for employees.

Topics to cover during the training can include:

- ◆ Police, fire, hospitals, ambulance
- ◆ Vehicle maintenance and repair procedures
- ◆ Defensive driving videos and exam
- ◆ List of equipment/tools to keep in vehicles
- ◆ Two-way radio communications
- ◆ Flat tire changing
- ◆ ATV rider safety
- ◆ Cholinesterase program
- ◆ First aid kits
- ◆ Poisonous bite procedures
- ◆ Local accommodations and per diem rates
- ◆ Local and public transportation
- ◆ Proper lifting techniques
- ◆ CPR training
- ◆ Using fire extinguishers effectively
- ◆ Airport, spray block, and pesticide storage area safety

- ◆ Training on specialized equipment used by your work unit or projects
- ◆ Weather
 - ❖ patterns
 - ❖ severe weather information radio stations and precautions
 - ❖ special equipment or clothing required
 - ❖ protection from the sun
- ◆ Procedures to use if a person receives a bomb threat

3

Aerial Application
Manual

Program Startup

Briefings

Contents

Introduction	page-3-7-1
Briefing Program Personnel	page-3-7-1
Preparing the Briefing	page-3-7-1
Conducting the Briefing	page-3-7-2
Further Briefings for Program Pilots	page-3-7-4

Introduction

Hold a general briefing session for all personnel, including those of the contractor, before work starts and as often as necessary during the course of the program. Hold this meeting at a location that will allow for convenient interaction of program personnel, viewing of program maps, documents, overheads, or flip charts.

Describe the program, its purpose, procedures to be followed, sensitive areas, obstructions or hazards within the area and en route, policy on flight over farms or residences, traffic patterns, minimum ferry altitudes (500 ft. above ground level (AGL)), precautions in handling the pesticide, and other safety measures.

Use the following checklist as a model to develop information to brief program personnel. Add or delete information as necessary to fit specific needs of your programs.

Briefing Program Personnel

The following is a checklist for briefing all program personnel. Also, refer to **Daily Briefings** under **Daily Briefing and Map Updates** in the **Program Supervision** section.

Preparing the Briefing

1. Assure that all program personnel are informed of the time and location of the meeting.
2. Gather supplies for the briefing for distribution or review:
 - A. sufficient number of copies of completed maps or road maps for distribution
 - B. master program maps

- C. current Federal prospectus
- D. supply of Daily Aircraft Record (PPQ Form 802)
- E. time and attendance sheets
- F. travel vouchers
- G. equipment and supplies to be signed out or distributed

Conducting the Briefing

1. Introduction and overview of the pest program.
 - A. goals of the project. (i.e., reducing damage; support exports; etc.)
 - B. pesticide used and its effect on the target pest
 - C. describe the importance of a properly executed project
2. Distribute the completed program maps.
 - A. discuss or describe the map legend
 - B. discuss the map scale
3. Use the master program map to indicate:
 - A. spray area boundaries
 - B. sensitive area(s) in the spray block(s)
 - C. acres to be treated and ownership
 - D. prominent landmarks
 - E. topography
 - F. hazards
 - G. restricted military areas and low fly corridors for military aircraft
 - H. access roads to spray area
 - I. ferry routes
 - J. other site specific information
4. Discuss spray operations:
 - A. timeframes for spray programs:
 - i. start and finish dates
 - ii. total operational hours allowed to complete spray programs
 - iii. scheduled hours of operation (including overtime)
 - iv. effects of weather on daily operations
 - B. order and direction the blocks will be sprayed

- C. airport/landing strip procedures:
 - i. airport/strip restrictions (if any)
 - ii. location of aircraft parking
 - iii. type and number of application aircraft
 - iv. location/operation of loading/mixing equipment
 - v. base location
 - vi. policy on airport/strip cleanup
 - vii. safety around aircraft
- D. pesticide handling, safety, and spill procedures:
 - i. location of safety equipment and supplies
 - ii. proper use of protective equipment (i.e., coveralls, gloves, goggles, boots, eyewash stations, etc.)
 - iii. location and use of fire extinguishers
 - iv. contents and use of spill kits at the airstrip and treatment area
 - v. location, contents, and use of first aid kits, first aid procedures
 - vi. emergency phone numbers
- 5. Use and care of 4 wheel drive vehicles.
- 6. Radio communications:
 - A. frequencies and channels
 - B. appropriate messages
 - C. "Ten" codes and "Seven" codes that are going to be used
- 7. How to handle calls and contacts from the news media and the public
- 8. Personnel matters:
 - A. policy on time and attendance
 - B. policy on annual and sick leave
 - C. rules on overtime charges
 - D. policy on expenses
- 9. Aircraft operations:
 - A. plugged nozzle policy
 - B. height of flight
 - C. proper shut off/turn on
 - D. turnarounds

- E. emergency dumps
- F. ferry height
- G. safety around aircraft
- 10. Weather conditions:
 - A. wind speed and direction and how it will affect operations
 - B. air and ground temperatures and how inversions affect operations
 - C. cloud formations, fog, dew, and how it will affect operations
- 11. Environmental monitoring:
- 12. duties of the monitoring coordinator or designated person
- 13. location of sensitive areas
- 14. use of dye cards

Further Briefings for Program Pilots

The following is a list of items and topics that the contractor should know prior to beginning a spray project. Policy regarding some of these topics can be located in environmental impact statements, environmental assessments, program manuals, guidelines, agency memorandums, or with the program manager.

Discuss these items with the contractor to avoid confusion and/or liquidated damages.

- 1. Role of the government pilot
- 2. Height of application flight to be determined by COR or rule of thumb: 1 wing span equal to the height of ferry flight (500 ft. AGL) (e.g., Cessna AG-TRUC 41'3" and normal application height is around 50')
- 3. Swath width
- 4. Spray pressure
- 5. Calibration - number and type of nozzles
- 6. Boom timer usage
- 7. Load and clean spray system under supervision
- 8. Stopped nozzles - clean all nozzles
- 9. Wind
- 10. Temperature - ground and air
- 11. In and out of field - wings parallel to edge of field
- 12. No cutting in and out of flight line
- 13. Adjust height of flight by the use of hand signals

14. Use of red flag
15. No regular lunch break
16. Tardiness
17. Spraying unauthorized areas - water, vehicles, etc.
18. Dye card use
19. Role of observation aircraft
20. Role of ground observers
21. Cut off for open areas
22. Wind meters
23. Contractor use of Government radios
24. Beehive locations
25. Paint
26. Safety
27. Negligent spillage
28. Guidance type and operation
29. Skips in spray pattern
30. Review Federal prospectus for aerial application
31. Program policy for:
 - A. liquidated damages
 - B. respray policy
 - C. billing procedures and use of Daily Aircraft Record, PPQ Form 802

3

Aerial Application
Manual

Program Startup

Treatment Area

Contents

Introduction	page-3-8-1
Treatment Area	page-3-8-1
Become Familiar With the Treatment Area	page-3-8-1
Marker Use (Boundary Flagging)	page-3-8-2
Identification of Hazards and Sensitive Areas	page-3-8-2
Buffer Zones When Using Liquid Chemical and Bait Alternatives	page-3-8-3
Verification of Spray Blocks, Sensitive Areas, and Buffer Zones	page-3-8-4

Introduction

The COR will be coordinating the ground crew and the contractor personnel during the program. Having a clear understanding of the treatment area will greatly increase efficiency and accuracy of the treatment activities.

Treatment Area

Become Familiar With the Treatment Area

Analyze the boundaries, buffer zones, and sensitive areas identified on a program map. Identify available personnel who know the area to help find boundaries and sensitive areas, so that the block is flagged effectively.

Before treatment begins, take reconnaissance flights or make ground observations to accomplish the following:

- ◆ Assess environmental concerns by looking for unknown sensitive areas and hazards.
- ◆ Ensure that apiaries have been moved from the treatment area.
- ◆ Look for boundary markers that are out of place.
- ◆ Familiarize pilot(s) with the treatment area: boundaries, terrain, hazards, buffer zones, areas not to be treated, and safety concerns such as high power lines and emergency landing areas.
- ◆ Verify direction of application and treatment boundaries.

Find out the extent of freedom to adjust treatment boundaries after control activities begin, allowing for missed or shifted infestations. When adjustments are made, check with cooperators to ensure that all lands included in the program have been approved for treatment by the owners.

Marker Use (Boundary Flagging)

Encourage cooperating landowners/managers to assist in marking the proposed treatment boundaries. The most satisfactory markers are white muslin. Refer to **Duties of Ground Observer (Scout)** under **Personnel, Materials, and Equipment** in the **Program Planning** section for detailed information on markers. All markers should be indicated on the program map.

Identification of Hazards and Sensitive Areas

Advise the ground crew to be on the lookout for hazards and sensitive areas. Ask cooperators and landowners/managers to advise you of hazards and sensitive areas.

Hazards—Types of hazards to low-flying aircraft are as follows. These hazards can also be used as reference points for pilots.

- ◆ Towers (radio, microwave, water, etc.)
- ◆ Electric, high-tension wires
- ◆ Smokestacks
- ◆ Silos
- ◆ Grain elevators
- ◆ Barns
- ◆ Houses and other buildings
- ◆ Mountains, hills, mesas, and buttes
- ◆ Elevation relief (changes in elevation)
- ◆ Low altitude military flight patterns
- ◆ Other aircraft

Sensitive Areas—Types of sensitive areas that are not to be sprayed are as follows. The treatment boundaries can be adjusted at any time if sensitive areas are identified during pretreatment reconnaissance flights or are reported by cooperators.

- ◆ Hospitals and nursing homes
- ◆ Populated areas, such as towns, villages, housing developments
- ◆ Schools and school yards
- ◆ Crops or animals not registered on the label

- ◆ Beehives and negotiated bee buffers
- ◆ Poultry farms
- ◆ Parks, such as recreation areas and campgrounds
- ◆ Bodies of water such as lakes, ponds, rivers, small streams, and wetlands
- ◆ Endangered species and sensitive species buffers as negotiated with Federal and State fish and wildlife agencies, and Federal and State environmental protection agencies
- ◆ Land not included in the spray block, residents who object to their property being treated (if allowed under State and Federal law)
- ◆ Areas with parking lots, i.e., car dealerships, factories, malls, etc.

Bees—Double check the identified location and types of bees (honey or leafcutter). Review program guidelines regarding bee protection. Identify hive locations and bee foraging areas to develop protection measures.

Endangered or Sensitive Species—Identify buffer zones established for specific endangered or threatened species. To protect endangered and threatened species, follow other protective measures agreed upon and documented through consultation processes for proposed or listed species. Refer to the biological opinions. Protection measures developed through informal field level consultation must also be enforced.

Congested Areas—For all flights over populated areas such as towns, cities, villages, and housing developments, contact the FAA district office for a definition of congested area, and FAA requirements and clearance. Where possible, plan ferrying and turnaround routes to avoid flights over congested areas, bodies of water, and other sensitive areas that are not to be treated.

Except when treatment is mandatory under State law, avoid the property of owners who object to the treatment.

Buffer Zones When Using Liquid Chemical and Bait Alternatives

Standard operational procedures may be identified for each control alternative available to program managers and COR's. Consult program manuals, guidelines, environmental impact statements, or environmental assessments to familiarize yourself with program operational procedures.

Verification of Spray Blocks, Sensitive Areas, and Buffer Zones

After taking a pretreatment reconnaissance flight with the pilot, and confirming that everything is recorded on a master program map, jointly sign and date the map. It is important that the pilot(s) clearly understands where the buffer zones, sensitive areas, and spray block boundaries are in the treatment area.

3

Aerial Application
Manual

Program Startup

Support Agencies/Groups

Introduction

The following agencies, groups, and persons are typically contacted before spraying begins in the treatment area. Program managers may provide COR's a complete list of contacts or just the name and phone number of a county agent or local cooperator. Regardless of who makes the contacts, COR's are responsible for ensuring that all affected parties are contacted and the needed information is exchanged.

TABLE 3-9-1: Contacts Before Spraying Begins

If the agency, group, or person involved in the control program is:	Then provide the following information:
The airport manager	<ul style="list-style-type: none"> ◆ Insecticide storage area ◆ Contractor's responsibilities
A beekeeper	<p>Use program guidelines and procedures to notify beekeepers of the:</p> <ul style="list-style-type: none"> ◆ treatment area and distance away to move bees ◆ spray dates and times of application ◆ insecticide to be used
A representative for private landowners involved	<ul style="list-style-type: none"> ◆ Important aspects of the program ◆ Complaints
A county agent	<ul style="list-style-type: none"> ◆ Details of the program ◆ Contacts to be handled by the county agent ◆ Public meeting organization
A fire department covering the airport and treatment blocks	<ul style="list-style-type: none"> ◆ Pesticide storage areas ◆ Pesticide label and MSDS ◆ Treatment area boundaries
A hospital	<ul style="list-style-type: none"> ◆ Formulation of pesticide ◆ MSDS
The police (highway patrol, sheriff)	<ul style="list-style-type: none"> ◆ Treatment area ◆ Insecticide storage area ◆ Special precautions on major highways during treatment, divert or hold traffic during treatments that could affect vehicles or travelers

TABLE 3-9-1: Contacts Before Spraying Begins

If the agency, group, or person involved in the control program is:	Then provide the following information:
The public	Use program guidelines to notify residents living within the treatment area of program scheduling
The U.S. Fish and Wildlife Service, State Game and Fish Departments	<ul style="list-style-type: none"> ◆ Sensitive areas, threatened and endangered species ◆ Protection
The land managing agency representing Federal land managers or Native American land involved	<ul style="list-style-type: none"> ◆ Treatment area boundaries ◆ Sensitive areas ◆ Support personnel ◆ Other groups or person to contact
An FAA district office	<ul style="list-style-type: none"> ◆ When and where spray and observation aircraft will be flying ◆ Request for FAA requirements regarding clearance for congested areas ◆ Planned location of insecticide storage area, if at airport
A State representative for State land involved	<ul style="list-style-type: none"> ◆ Program personnel ◆ Responsibilities of each cooperator
A Native American tribal group or representative	<ul style="list-style-type: none"> ◆ Program support ◆ Precaution

3

Aerial Application
Manual

Program Startup

Calibration of Aerial Spray Systems

Contents

Introduction [page-3-10-1](#)
Calibration Formula [page-3-10-2](#)
Calibration Adjustments [page-3-10-4](#)

Introduction

Calibration is the process of measuring and adjusting the amount of pesticide your equipment will apply to the target area. You need to be sure you are using the correct amount of pesticide. Too little pesticide can result in inadequate control. Too much pesticide can result in:

- ◆ Injury to people, plants, or animals
- ◆ Illegal residues
- ◆ Excess runoff or movement from the target
- ◆ Lawsuits and fines

Calibration was a frightening word to most early aerial applicators. The procedures were to mix, load, and fly. The pilot continually adjusted boom pressure and swath width as they went along to make the pesticide come out with the acreage. Some areas were overdosed and others were under dosed or completely missed. Advancing technology, education, demands by the rancher/farmer, pesticide laws, and label requirements are forcing the modern day aerial applicator to be calibration conscious.

An aircraft with a properly calibrated dispersal system reduces the workload of the pilot. He has enough to watch without constantly monitoring the amount of chemical remaining in the hopper, adjusting boom pressure, to make it all come out right.

The manufacturers of various nozzles, atomizers, and spray tips provide calibration formulas and/or procedures to calibrate their equipment properly. The formula used by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ) to calibrate aerial liquid systems is simple and accurate.

Before calibration procedures begin, the following factors must be known:

- ◆ Airspeed
- ◆ Swath width
- ◆ Application rate per acre
- ◆ Spray tip size (output per minute per nozzle)
- ◆ The flow factor for the chemical being used

With these known factors, you can use the following formulas:

Calibration Formula

$$\frac{\text{Miles per hour} \times \text{swath width in feet}}{495} = \text{Acres per minute}$$

$$\frac{\text{Acres per minute} \times \text{rate per acre in ounces}}{128 \text{ (ounces in 1 gallon)}} = \text{Gallons per minute}$$

$$\frac{\text{Gallons per minute}}{\text{Nozzle output}} = \text{Number of nozzles to install using water at 40 psi (boom pressure)}$$

Number of nozzles for water x chemical flow factor = **Number of nozzles to install on the aircraft for the chemical being used.**

Example

- ◆ Cessna Ag Truck
- ◆ Airspeed =120 mph
- ◆ Swath width =100 feet
- ◆ Pesticide =Malathion
- ◆ Application rate =8 oz. per acre
- ◆ Nozzle tip size =8002 flat fan
- ◆ Nozzle output =0.2 gallons per minute using water at 40 pounds per square inch (psi) (boom pressure)
- ◆ Correction flow factor for malathion =1.1

Step 1

Calculate the **ACRES PER MINUTE** that the aircraft will cover.

$$120 \text{ (mph)} \times 100 \text{ (foot swath)} = \mathbf{24.24 \text{ acres per minute}}$$

Step 2

Calculate the number of **GALLONS PER MINUTE** (gpm) that the aircraft will put out at the desired rate per acre.

$$\frac{24.24 \text{ (ac/min)} \times 8 \text{ (oz/ac)}}{128 \text{ (oz in 1 gallon)}} = 1.52 \text{ gpm}$$

Step 3

Calculate the number of nozzles required to apply **WATER** at 8 ounces per acre and pressure set at 40 psi.

$$\frac{1.52 \text{ (gpm)}}{0.2 \text{ (output per minute per nozzle)}} = 7.58 \text{ nozzles for water}$$

Step 4

Calculate the number of nozzles to install correcting for viscosity (flow factor) of the chemical being used.

$$7.58 \text{ (nozzles)} \times 1.1 \text{ (flow factor)} = \mathbf{8.3 \text{ nozzles}}$$

Step 5

Round to the nearest whole number.

8.3 rounded down to **8 nozzles to install on the aircraft.**



When the number of nozzles is not an even number, install the odd nozzle, evenly spaced, on the right boom.

Step 6

Conduct a calibration run either static (run the system on the ground and collect discharge from each nozzle into containers to determine the actual output per minute) or fill the spray tank to a known reference mark and fly the aircraft for 1 minute. Refill the tank to the known reference mark and determine the amount used. If the output was light or heavy, make small adjustments to the psi setting to achieve the correct output per minute. The final calibration check should be accomplished during actual application with a small load. Calibration is not a one time event (set it and forget it). Calibration should be monitored through the entire program. Some factors that could influence calibration are the following:

- ◆ Spray tips plugged (light application)

- ◆ Spray tips not tightened and lost during the load (heavy application)
- ◆ Leaks in the spray system, especially under pressure (heavy application)
- ◆ Spacing too wide or too narrow or pilot not observing block boundary (light or heavy application)
- ◆ Incorrect airspeed (light or heavy application)
- ◆ Load meter not properly calibrated - loaded wrong amount (light or heavy application)
- ◆ Terrain and elevation are factors that influence calibration and may require an additional nozzle

Calibration Adjustments

Follow this procedure to determine how many nozzles to add or remove. Be reminded, if the initial calibration procedures are followed and the aircraft is flying at the correct airspeed, this procedure should not be needed.

Step 1

Determine the actual rate applied per acre

$$\frac{\text{Number of gallons applied} \times 128}{\text{Number of acres treated}} = \text{Actual rate applied}$$

Step 2

Determine the number of nozzles required to achieve the desired application rate.

$$\frac{\text{Number of nozzles installed} \times \text{desired application rate}}{\text{Actual application rate}} = \text{Number of nozzles}$$

Step 3

Round the number of nozzles to the nearest whole number.

Step 4

Compare the calculated number of nozzles (**Step 3**) with the number of nozzles installed.

TABLE 3-10-1: Compare the Calculated Number of Nozzles

If the number of nozzles (Step 3) is:	Then:
Greater than the number of nozzles installed	ADD the necessary nozzles
Less than the number of nozzles installed	REMOVE the excess nozzles

NOTES:

1. Check calibration after the first load. Keep in mind that calibration can be off by as much as 50 percent depending on the amount of pesticide lost in priming the spray system, the initial amount of pesticide loaded, and the aircraft hopper capacity. In most cases, it is advisable to wait until after the second load before making calibration adjustments.
2. If the calculated number of nozzles to add or remove is less than one, adjust calibration by “fine tuning” the pressure up or down to achieve the desired flow.

Example

Douglas DC-4
Airspeed =180 mph
Swath width =550 feet
Pesticide =Malathion
Correction factor =1.1
Application rate =8 oz per acre
Nozzle tip size =8010

Initial calibration (condensed) =180 mph x 550 ÷ 495 =200 ac/min x 8 oz/ac ÷ 128 =12.5 ÷ 1.0 gal/min x 1.1 =13.75 round to 14 nozzles.

First Load—The aircraft is loaded with 300 gallons to treat 4,800 acres. All of the systems were dry (loading hoses/pump and spray system). The aircraft returned after treating 3,740 acres (about 22 percent “heavy”). You decide that some pesticide was lost in priming the system and make no adjustments.

Second Load—The aircraft with 800 gallons to treat 12,800 acres. The aircraft returned after treating only 11,000 acres (about 14 percent heavy).

How Many Nozzles Should You Remove, if Any?

Step 1—Number of gallons applied x 128 ÷ number of acres treated
=Actual rate applied

800 gallons x 128 oz/gal ÷ 11,000 =9.31 oz/ac applied
Number of acres treated

Step 2—Number of nozzles installed x desired oz/ac ÷ actual oz/ac
=Number of nozzles required

14 x 8 ÷ 9.31=12.03 nozzles

Step 3—Round to the nearest whole number
12.03 =12 nozzles

Step 4—Calculate the number of nozzles to remove
14 minus 12 =2 nozzles to remove

Useful Information

128 oz/gal ÷ rate per acre =acres/gal

128 oz ÷ 8 =16 acres/gal

128 oz ÷ 12 =10.67 acres/gal

128 oz ÷ 16 =8 acres/gal

128 oz ÷ 20 =6.4 acres/gal

128 oz ÷ 32 =4 acres/gal

128 oz ÷ 40 =3.2 acres/gal

128 oz ÷ 96 =1.33 acres/gal

Total program acres ÷ acres per gallon =total gallons required

Airspeed (mph) x swath width in feet ÷ 495 =acres per minute

Acres per minute ÷ acres per gallon =gallons per minute

Gallons per load ÷ gallons per minute =dispersal time per load

Gallons dispersed ÷ acres covered x 128 =rate/acre in ounces

Swath width in feet ÷ 8.25 =acres/mile

Acres/mile ÷ acres/gallon =gallons/mile

Gallons/mile x swath length in miles =gallons/swath

Aircraft load in gallons ÷ gallons/swath =number of swaths/load

Kilograms/hectare (x 0.82) =pounds/acre

Pounds/acre (x 1.12) =kilograms/hectare

One cubic foot will hold 7.5 gallons of water

Fluid ounces/acre (x 73.14) =milliliters/hectare

Convert Knots to Miles and Miles to Knots

Knots x 1.15 =MPH

160 knots x 1.15 =185 mph

MPH x .868976 =Knots
135 mph x .868976 =117 knots

One square mile =640 acres
One acre =43,560 square feet =0.405 hectares
One hectare =2.471 acres
One gallon per acre =9.35 liters per hectare
One gallon =128 fluid ounces =8 pints =4 quarts
One gallon =3.785 liters =3,785 milliliters
One liter =33.814 fluid ounces
One kilogram =2.205 pounds
One square yard =0.836 square meters
One fluid ounce =29.57 milliliters
Degrees F to degrees C =°F (-32) x (.556) =°C
Degrees C to degrees F =°C ÷ (.556) + 32 =°F
One mile =5,280 feet =1,610 meters =1.61 kilometers

TABLE 3-10-2: Flow Factor Table for Spraying Solutions Other Than Water

Weight of solution:	Specific gravity:	Correction Factors:
7.0 lbs. per gallon	.84	.92
8.0 lbs. per gallon	.96	.98
8.34 lbs. per gallon-WATER	1.00	1.00
9.0 lbs. per gallon	1.08	1.04
10.0 lbs. per gallon	1.20	1.095
10.65 lbs. per gallon	1.28	1.12
11.0 lbs. per gallon	1.32	1.15
12.0 lbs. per gallon	1.44	1.20
14.0 lbs. per gallon	1.68	1.30

If the pesticide being used has a density or flow characteristic different than water, a correction factor will need to be applied.

If the correction factor is unknown, it can be determined from the specific gravity of the pesticide being used.

$$\text{Specific gravity (S.G.)} = \frac{\text{Weight of Pesticide (lbs./gal)}}{8.34 \text{ (lbs./gal - water)}}$$

Example: Malathion weighs 10.25 lbs. per gallon.

$$\frac{10.25 \text{ (lbs./gal)}}{8.34 \text{ (lbs./gal - water)}} = 1.23 \text{ (S.G.)}$$

- The correction factor for 10.0 lbs. is 1.095
- The correction factor for 10.65 lbs. is 1.12
- Interpolate – use – 1.1

3

Aerial Application
Manual

Program Startup

Aircraft Guidance

Contents

Electronic Guidance	page-3-11-1
Loran C	page-3-11-1
Global Positioning System (GPS)	page-3-11-2
Flight Path Recording	page-3-11-2
DGPS Accuracy Check Procedures	page-3-11-2

Electronic Guidance

Electronic guidance will be furnished by the application contractor when required in the contract. It must be capable of guiding the aircraft along parallel flight lines equal to the assigned swath width by means of a course deviation indicator (CDI) or course deviation light bar. The system and detailed specifications will be stipulated in the solicitation.

There are two electronic guidance systems currently being used.

Loran C

Loran C is a radio navigation system which uses time synchronized pulsed signals from ground transmitting stations spaced several hundred miles apart. The stations are configured in chains of three to five stations which transmit with the same pulse group repetition interval. Within each chain, one station is designated as the master, and the remainder are secondaries.

An aircraft-mounted Loran C receiver converts the “time difference” between the arrival of radio signals from the master and the secondaries into latitude/longitude coordinates. Navigational values such as distance and bearing to the treatment area are computed from the aircraft’s present latitude/longitude geographical location.

A GRIDNAV software program designed to establish a rectangular grid pattern provides aircraft guidance to the pilot during aerial application. The pilot enters the geographical coordinates for the first pass plus the desired swath width into the program before leaving on his mission. The GRIDNAV software will automatically provide directional and spacing guidance for each pass and keep track of the number of passes during the aerial application operation. This system eliminates the need for ground personnel.

Mountainous terrain, mineral deposits, and position of the aircraft with relation to the stations can affect the precision of the system. Users can expect a position error of 60 feet or more. This makes Loran C unsuitable for applications which require narrow spacing. It is especially useful for releasing sterile insects where swath spacing is much wider and accuracy less critical.

Global Positioning System (GPS)

The GPS consists of a constellation of satellites orbiting the earth at an altitude of 10,900 nautical miles. The current position and altitude of each satellite is transmitted and received by a GPS receiver. The time it takes the radio signal from several satellites to reach the receiver is converted to distance. These distances are used to determine the receiver's position by triangulation.

GPS provides aircraft guidance in the same manner as Loran C and is not affected by the conditions that affect Loran C. However, it must maintain "line of sight" contact with the satellites being used. A position error of 60 to 100 feet can be expected under normal conditions and can be reduced to 3 to 6 feet with differential correction. Differential correction can be accomplished by placing a GPS receiver base unit at a known location and using it to determine exactly what error the satellite data contains. The base unit then transmits an error correction to the GPS receiver in use. Differential correction can also be obtained from a satellite specially designed for that purpose.

Flight Path Recording

When recording equipment is required, it shall be compatible with the guidance system being used and have software that will allow the flight to be downloaded into a computer for review. The flight log must show the entire flight of the aircraft from takeoff to landing and differentiate between spray on and spray off when viewed on the computer monitor. The software must have the capability to zoom to any portion of the flight for viewing in greater detail and a method to determine distance between each flight lane.

DGPS Accuracy Check Procedures

When a contractor is requested to furnish electronic guidance and flight path recording, the type system and specifications will be stipulated in the solicitation. Different makes/models of DGPS guidance systems with flight data logging capability may qualify for acceptance and use on PPQ programs. The accuracy of each unit and the flight data logging capability must be verified before acceptance on

the program. Depending on the system, different procedures may be required to verify the accuracy of the system. The following procedures may be used to accept or reject various systems.

1. To verify the accuracy of the differential correction signal and that a functional pressure switch is installed, load 20 to 30 gallons of water into the hopper, and have the pilot fly three passes along the center line of the runway at 5 feet above the runway. Stress to the pilot the importance of keeping the aircraft directly over the center line. During each pass, preferably at the runway identification numbers, open the spray valve with the boom pressure set at 40 psi.
2. To verify the pilot's knowledge and skill using the guidance system, select a field, nearby if possible, which contains 10 or 12 passes of the assigned swath width of the aircraft. Have the pilot spray this field, using water, at the altitude and swath width as specified in the contract. Trim passes will be required to show boundaries of the field and verify that the data logging system does not have an unacceptable amount of spray on/off delay. If practicable, observe the pilot's performance while spraying the demonstration field. Ask the pilot to return to the airport and make one additional pass along the runway center line, for a total of four passes over the center line.
3. Download the flight data in to the computer and bring up the flight. Zoom in to the portion of the flight along the runway and examine the flight track for deviations. Deviations of 3 feet may be acceptable. Deviations of 6 to 8 feet or more are not acceptable. Observe for sharp jumps or instant deviations. This may be an indication that differential correction was not being applied or was lost. Pay close attention to the track of the fourth pass. If the constellation of satellites changed during the spraying of the field and differential correction was not operational, the pass could be offset from 3 to 120 feet.
4. Zoom to the portion of the flight where the field was sprayed. Measure the distance between each pass and compare to the assigned swath width. Look for straight passes or if the pilot zig-zagged down each pass (an indication that the pilot was chasing the needle and may not be experienced in using the system). Observe that the system is indicating when the spray was on and off and that the ending and beginning of swaths match the edge of the field. The delay between on/off should be no greater than 10 to 12 feet for back and forth passes and none for same direction race-track pattern.
5. An alternate method to verify the accuracy and function of the guidance system and logging capability is to flag for the pilot 10 to 12 measured swaths. To insure accuracy and avoid delays, the swaths should be premeasured and flagged from both ends. If

practical, the length of the swaths should be 800 to 1,500 feet. Use the same procedures as above for viewing the flight. Look for straight lines between the flaggers or if there are sharp jumps or spikes in the flight path. This may indicate that differential correction was not being received or available.

3

Aerial Application
Manual

Program Startup

Pilot/Aircraft Inspection

Contents


[Aircraft and Pilot Qualification Acceptance Report \(PPQ Form 816\) Instructions
page-3-12-1](#)

Aircraft and Pilot Qualification Acceptance Report (PPQ Form 816) Instructions

1. **PROGRAM:** Indicate the acronym for name of program.

EXAMPLE: Southeast Boll Weevil Eradication Program (SEBWEP).

2. **REGION:** Indicate the acronym for name of region in which program is being conducted. Example: Southeast Region (SER).
3. **CHECK-IN-SITE:** Indicate name of check-in-site. Example: Morris Airstrip.
4. **CONTRACT NO.:** Copy the number from the contract.
5. **DATE:** Indicate the check-in-date.
6. **CONTRACTOR'S NAME AND MAILING ADDRESS** (*include Zip code*): Indicate contractor's name, mailing address, and phone number.
7. **REGISTERED AIRCRAFT OWNER'S NAME AND MAILING ADDRESS** (*include Zip code*):
 - A. Look at the aircraft registration certificate for this information. Verify that the registration marks (tail number) are the same as on the aircraft. Enter the word "same" in this block if the contractor is the registered owner.
 - B. The registration certificate is not required to be carried in agricultural aircraft, but must be available for inspection at the site from which flight operations are being conducted.
 - C. The commercial nonagricultural observation aircraft must have its registration certificate on board at all times. (See [Figure 3-12-1](#) for an example.)

REGISTRATION NOT TRANSFERABLE		
UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION CERTIFICATE OF AIRCRAFT REGISTRATION		This certificate must be in the aircraft when operated.
NATIONALITY AND REGISTRATION MARKS N 731EQ	AIRCRAFT SERIAL NO. 18802843T	
MANUFACTURER AND MANUFACTURER'S DESIGNATION OF AIRCRAFT CESSNA A188B ICAO Aircraft Address Code: 52347465		
I S S U E D T O	UNITED STATES DEPARTMENT OF AGRICULT APHIS-PPQ RT 3 BOX 1001 EDINBURG TX 78539	This certificate is issued for registration purposes only and is not a certificate of title. The Federal Aviation Administration does not determine rights of ownership as between private persons.
	GOVERNMENT	
It is certified that the above described aircraft has been entered on the register of the Federal Aviation Administration, United States of America, in accordance with the Convention on International Civil Aviation dated December 7, 1944, and with the Federal Aviation Act of 1958, and regulations issued thereunder.		
DATE OF ISSUE SEPT. 07, 1985	 U.S. Department of Transportation Federal Aviation Administration	

AC Form 8050-3(7/89) Supersedes previous editions

- Registration number, aircraft serial number, make/model, and to whom issued. The FAA does not determine rights of ownership as between private persons.
- For the purpose of completing the aircraft acceptance report (under aircraft owner), use the information as provided from this certificate.
- This certificate need not be carried in the application aircraft, but must be available for inspection at the site from which the flight operation is conducted.

NOTE: The above rule does not apply to the commercial nonagricultural observation aircraft.

FIGURE 3-12-1: Example of Certificate of Aircraft Registration

8. STATE PESTICIDE REGISTRATION NO. AND EXPIRATION DATE:

- This document is issued to the business itself and is not to be confused with the State applicator license which is issued to an individual pilot (Block 29).
- Copy the registration number and expiration date from the document itself. (See [Figure 3-12-2](#) for an example of a Contractor's Pesticide License.)

DEPARTMENT OF AGRICULTURE
AGRICULTURE BUILDING CAPITOL SQUARE
PIERRE, SOUTH DAKOTA

007997

Thomas T. Irvine, Commissioner

PESTICIDE CONTRACTOR

LICENSE NO	EFFECTIVE	EXPIRES
6231	01/01/93	12/31/93

THE HOLDER OF THIS LICENSE HAS MET THE REQUIRED LAWS AND REGULATIONS OF THE SOUTH DAKOTA DEPARTMENT OF AGRICULTURE AND IS HEREBY AUTHORIZED TO CONDUCT COMMERCIAL OPERATIONS IN THE CAPACITY DESIGNATED HEREON.

B.R. FLYING SERVICE
P.O. BOX 2082
MISSION, TEXAS 78572

AGRICULTURAL PEST CONTROL
AERIAL EQUIPMENT AUTHORIZATION

THOMAS T. IRVINE, COMMISSIONER OF AGRICULTURE

THIS LICENSE MUST BE POSTED AT ALL TIMES IN A PROMINENT PLACE WITHIN THE BUSINESS.

1. Record license number.
2. Record expiration date.

FIGURE 3-12-2: Example of Contractor's Pesticide License

9. FAA AGRICULTURAL OPERATING CERTIFICATE NO.:

- Record the certificate number found in the lower left hand corner in Block 9.
- This certificate is issued by the FAA to operators that have demonstrated their ability to dispense economic poisons as described in FAR Part 137, Agricultural Aircraft Operations. The contractor is required to have this certificate available (a facsimile) at the inspection site. Pilots operating under this certificate are required to have a letter of competency from the holder of this certificate (Block 33).
- No person may operate an aircraft dispensing economic poisons unless a copy of the agricultural aircraft operators certificate is carried in that aircraft.
- This certificate includes a low-altitude waiver to allow application flight below 500 feet without creating a hazard to persons or property on the surface. (See [Figure 3-12-3](#) for an example of an Operating Certificate.)

OPERATIONS OVER CONGESTED AREAS, GENERAL:

Prior written approval from appropriate officials over which the operations are conducted.

Notice of intended operation must be given to the public through all news media.

A plan for each complete operation must be submitted to, and approved by appropriate personnel of the Federal Aviation Administration District Office having jurisdiction over the area where the operation is to be conducted.

The image shows a sample Operating Certificate from the Federal Aviation Administration. It is a rectangular document with a double-line border. In the top left corner is the FAA logo and the text "U.S. Department of Transportation Federal Aviation Administration". The title "Operating Certificate" is centered in a large, bold font. Below the title, it states "This certifies that" followed by the address: "U. S. DEPARTMENT OF AGRICULTURE, ROUTE 3, BOX 1001, EDINBURG, TEXAS 78539". The certificate then states that the entity has met the requirements of the Federal Aviation Act of 1958 and is authorized to operate as an Air Operator and conduct Commercial Agricultural Aircraft Operations. It specifies that dispensing of economic poisons is permitted. A disclaimer states the certificate is not transferable and remains in effect indefinitely. The bottom section contains fields for the certificate number (U6SG138Y), effective date (APRIL 6, 1994), and issued at (SAN ANTONIO, TEXAS). On the right, there is a signature line for Charles B. Taylor, Manager, SAT-FSDO.

U.S. Department of Transportation
Federal Aviation Administration

Operating Certificate

This certifies that

U. S. DEPARTMENT OF AGRICULTURE
ROUTE 3, BOX 1001
EDINBURG, TEXAS 78539

has met the requirements of the Federal Aviation Act of 1958, as amended, and the rules, regulations, and standards prescribed therein, for the issuance of this certificate and is authorized to operate as an Air Operator and conduct **Commercial Agricultural Aircraft Operations**.

in accordance with said Act and its rules, regulations, and standards; **dispensing of economic poisons is permitted.**

This certificate is not transferable and, unless canceled, suspended, superseded, surrendered or revoked, shall continue in effect **indefinitely.**

By Direction of the Administrator.

Certificate number: U6SG138Y

Effective date: APRIL 6, 1994

Issued at: SAN ANTONIO, TEXAS

Charles B. Taylor
CHARLES B. TAYLOR
(Signature)
MANAGER, SAT-FSDO
(Title)

FIGURE 3-12-3: Example of Operating Certificate

- AIRCRAFT REGISTRATION NO.:** This number is found on the aircraft registration certificate in the block labeled "NATIONALITY AND REGISTRATION MARKS" and is painted on the side of the aircraft fuselage. It is preceded by the letter "N" and is also called the "N" number or tail number. (See [Figure 3-12-4](#) for an example.)

11. MAKE/MODEL: This information is found on the aircraft registration certificate in the block labeled “MANUFACTURER AND MANUFACTURER’S DESIGNATION OF AIRCRAFT.”

12. DATE OF ANNUAL INSPECTION:

- A. The aircraft log contains a record of annual inspections, 100 hour inspections, repairs, and routine maintenance performed on the aircraft. (See **Figure 3-12-4** for example.)
- B. Check the date of the last **annual** inspection. If more than 12 months have elapsed, another is required. It is preferable, but not required, that the aircraft have a “fresh” annual inspection. However, it should at least have enough time left on it to last through the life of the contract to avoid program delays.
- C. For large aircraft: An FAA approved progressive maintenance program is acceptable in lieu of the 100 hour/annual inspection.
- D. The logbook entry for an annual inspection must be signed by an FAA licensed mechanic with inspection authorization (IA). Look at the license number displayed under the mechanic’s signature. If it has the letters “IA” at the end of the number, he/she has inspection authorization. Example: A&P 1234567IA.
- E. Agricultural aircraft are not required to have a 100 hour inspection unless they are operated over congested areas. If operation is over congested areas, check the number of hours logged since the last 100 hour inspection. If 100 hours or more have been logged since the last inspection, another inspection is required. The mechanic that signs off the 100 hour inspection is not required have inspection authorization.

DATE 15	RECORDING TACH TIME	TODAYS FLIGHT	TOTAL TIME IN SERVICE	DESCRIPTION OF INSPECTIONS, TESTS, REPAIRS AND ALTERATIONS ENTRIES MUST BE ENDORSED WITH NAME, RATING AND CERTIFICATE NUMBER OF MECHANIC OR REPAIR FACILITY. (SEE BACK PAGES FOR OTHER SPECIFIC ENTRIES.)
7 MAR	1245.8			Complied with ANNUAL inspection in accordance with FAR
	235.4	ESMOH		43, Appendix D. and Cessna Service Manual. All inspection
	5110.6	T.T. A/C		panels removed and reinstalled. All filters cleaned or
				replaced as required. Wheels repacked, replaced LH
				brake linings P/N 66-109 (4 each). Serviced battery,
				brakes and Hyd. systems. Cleaned and lubed all flight
				control cables, chains and pulleys. Replaced ELT battery
				ops checked OK, next battery change due Mar 98. C/W
				AD 87-20-03 R3 by inspection of seat locking, checked
				within limits, Next inspection due 5210.6. C/W SEB's
				96-98 and 96-99. All AD's current as of this date, see
				listing contained in aircraft flight package. Flight
				and ground checks complied with OK. " I certify that this
				aircraft has been inspected in accordance with an ANNUAL
				inspection and was determined to be in airworthy
				condition. Date: 7/1/96 A/C Time: 5110.6
				Signature: John Doe
				Cert. No: 57654321 JA

FIGURE 3-12-4: Example of a Maintenance Record

13. **CATEGORY A, B, C, or D:** Obtain from the Aircraft Categories chart in the Federal aerial application prospectus or this manual (see [Aircraft Categories](#) under [Aircraft Selection](#) in the **Program Planning** section).
14. **SPEED (MPH):** Ask the pilot what his working speed will be and verify it by consulting the charts in the **Program Planning** section of this manual.
15. **DATE AVAILABLE:** Use same date as in Block 5.
16. **OBSERVATION AIRCRAFT TIME SINCE 100 HOUR INSPECTION:**
 - A. Unlike agricultural aircraft, the observation aircraft is required to have a 100 hour inspection. The mechanic that signs off this inspection is not required to have inspection authorization.
 - B. Check the aircraft logbook for the number of hours flown since the last inspection. If it is more than 100, another inspection is required. (See [Figure 3-12-5](#) for an example.)

DATE	RECORDING TACH TIME	TODAYS FLIGHT	TOTAL TIME IN SERVICE	DESCRIPTION OF INSPECTIONS, TESTS, REPAIRS AND ALTERATIONS ENTRIES MUST BE ENDORSED WITH NAME, RATING AND CERTIFICATE NUMBER OF MECHANIC OR REPAIR FACILITY. (SEE BACK PAGES FOR OTHER SPECIFIC ENTRIES.)
7 MAR 1996	1707.9			Performed 100 Hr. inspection in accordance with Cessna
	263.0	ESMOH		Service Manual and FAR 43 Appendix D. Inspected and
	3104.6	T.T.	A/C	lubed flight controls. Repacked and inspected wheel
				bearings. Serviced and inspected battery, brakes and
				Hyd. systems. ELT inspected satisfactory, battery due
				Mar 97. Replaced Hyd., vacuum air and oil filters as
				required. Complied with SEB 96-99. All AD's current as
				of this date, see listing located in rear of log book.
				Complied with AD 96-01-98, 96-02-99, 96-03-99.
				Engine and aircraft systems operation checks complied
				with satisfactory. " I certify that this aircraft has
				been inspected in accordance with a 100 Hr inspection
				and was determined to be in airworthy condition."
				<i>John Smith</i>
				12345678 AP

FIGURE 3-12-5: Example of an Aircraft Log

17. **CHEMICAL:** Specified in the solicitation.
18. **RATE/ACRE:** Specified in the solicitation.
19. .(This number is not on the form.)
20. **ASSIGNED SWATH:** Obtain from the aircraft categories chart found in the Federal annual aerial prospectus or in **Aircraft Categories** under **Aircraft Selection** in the **Program Planning** section.
21. **PROOF OF INSURANCE:** Check to see that the contractor has the insurance coverage specified in the solicitation. (See **Figure 3-12-6** for an example.)

ACORD. CERTIFICATE OF INSURANCE						DATE (MM/DD/YY) 08/12/94	
PRODUCER ACME INSURANCE AGENCY 1234 BACK ST SOMEWHERE TX 12345				THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.			
INSURED ACME FLYING SERVICE RT #3 BOX 1001 ELSEWHERE TX 56789				COMPANIES AFFORDING COVERAGE COMPANY A American Eagle Insurance Co. COMPANY B American Federated Insurance Co. COMPANY C USAIG COMPANY D			
COVERAGES THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN. THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.							
CO LINE	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS		
A	<input checked="" type="checkbox"/> GENERAL LIABILITY <input type="checkbox"/> COMPREHENSIVE FORM <input checked="" type="checkbox"/> PREMISES/OPERATIONS <input type="checkbox"/> UNDERGROUND <input type="checkbox"/> EXPLOSION & COLLAPSE HAZARD <input checked="" type="checkbox"/> PRODUCTS-COMPLETED OPER <input type="checkbox"/> CONTRACTUAL <input type="checkbox"/> INDEPENDENT CONTRACTORS <input type="checkbox"/> BROAD FORM PROPERTY DAMAGE <input type="checkbox"/> PERSONAL INJURY	AFE 0139708-00	01/17/94	01/17/95	BODILY INJURY OCC BODILY INJURY AGG PROPERTY DAMAGE OCC PROPERTY DAMAGE AGG BI & PD COMBINED OCC BI & PD COMBINED AGG PERSONAL INJURY AGG	\$ \$ \$ \$ \$1,000,000. \$1,000,000. \$	
	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS (Private Pass) <input type="checkbox"/> ALL OWNED AUTOS (Other than Private Passenger) <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS <input type="checkbox"/> GARAGE LIABILITY				BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE BODILY INJURY & PROPERTY DAMAGE COMBINED	\$ \$ \$ \$	
	EXCESS LIABILITY <input type="checkbox"/> UMBRELLA FORM <input type="checkbox"/> OTHER THAN UMBRELLA FORM				EACH OCCURRENCE AGGREGATE	\$ \$	
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY <input type="checkbox"/> THE PROPRIETOR/PARTNER/EXECUTIVE OFFICERS ARE <input checked="" type="checkbox"/> INCL <input type="checkbox"/> EXCL <input type="checkbox"/> OTHER	WC 294-0000527	04/01/94	04/01/95	STATUTORY LIMITS EACH ACCIDENT DISEASE - POLICY LIMIT DISEASE - EACH EMPLOYEE	\$100,000. \$500,000. \$100,000.	
C	AIRCRAFT LIABILITY	400AC-35258	09/16/93	09/16/94	\$100,000 Bodily Injury Ea Per 300,000 Bodily Injury Ea Oct 100,000 Property Damage Incl. Comprehensive Chemical Drift		
DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS Cessna AGTRUCK N731BQ							
CERTIFICATE HOLDER Southeastern Boll Weevil Eradication Foundation, Inc. Bell Oaks Plaza, Suite B 2424 East South Boulevard Montgomery, Alabama 36446-2506				CANCELLATION SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL 10 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES.			
ACORD 25-H (3/93)				AUTHORIZED REPRESENTATIVE Charles S. Smith CHARLES S. SMITH © ACORD CORPORATION 1993			

FIGURE 3-12-6: Example of a Certificate of Insurance

22. AIRWORTHINESS CERTIFICATE CATEGORY:

- A. There are two types of airworthiness certificates--standard and special. The agricultural aircraft is required to have a special airworthiness certificate. It is a pink card, and Block A will say "Restricted" on the top line and "Agricultural & Pest Control" on the next line on the top line.
- B. This certificate need not be carried in agricultural aircraft; however, it must be available with other documents for inspection at the site from which flight operations are conducted. (See [Figure 3-12-7](#) for an example.)

UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION — FEDERAL AVIATION ADMINISTRATION SPECIAL AIRWORTHINESS CERTIFICATE	
A	CLASSIFICATION: Restricted
B	PURPOSE: Agriculture & Pest Control
B	MANUFACTURER: Cessna Aircraft Company
C	FLIGHT: FROM: 11 TO: 21
D	N- 9664K SERIAL NO. 188039651
D	DATE OF EXPIRATION: 3-31-83 MODEL: A188B
E	OPERATING LIMITATIONS: OPERATED (FAR 91.39) ARE A PART OF THIS CERTIFICATE
E	SIGNATURE OF FAA REPRESENTATIVE: VISTRA DESIGNATION OR OFFICE NO. DOA-PC4

Any alteration, reproduction, or misuse of this certificate may be punishable by a fine not exceeding \$1,000 or imprisonment not exceeding 1 year, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS.

FAA FORM 8130-7 (3-82) SUPERSEDES FAA FORMS 1302-B; 8100-2; 8100-3 SEE REVERSE SIDE

- This certificate need not be carried in the agricultural aircraft; however, it must be kept available with other documents for inspection at the site from which flight operations are conducted.
- Restricted category civil aircraft must be operated for the special purpose for which it is certificated (i.e., Agriculture and Pest Control).

FIGURE 3-12-7: Example of a Special Airworthiness Certificate

23. **PILOT'S NAME AND MAILING ADDRESS:** Ask the pilot for the current address and phone number. The address listed on the Pilot Certificate is not always correct.
24. **CERTIFICATE AND NO. (ATP or Commercial):** The pilot certificate information includes pilot identification and statistics, and qualifications, such as "COMMERCIAL PILOT" or "AIRLINE TRANSPORT PILOT." (See [Figure 3-12-8](#) for an example.)

I. UNITED STATES OF AMERICA		XI.	
DEPARTMENT OF TRANSPORTATION — FEDERAL AVIATION ADMINISTRATION			
THIS CERTIFIES IV.			
THAT V. GILBERTO D RODRIGUEZ			
2801 CARNATION AVE			
MCALLEN TX 78501			
DATE OF BIRTH	HEIGHT	WEIGHT	HAIR
08-27-35	66	145	GRAY
EYES	SEX	NATIONALITY	VI.
BROWN	M	USA	
IX. HAS BEEN FOUND TO BE PROPERLY QUALIFIED TO EXERCISE THE PRIVILEGES OF			
II. COMMERCIAL PILOT		III. CERT. NO. 1497570	
RATINGS AND LIMITATIONS			
AIRPLANE SINGLE & MULTYENGINE LAND			
XII. INSTRUMENT DC-3S CV-240 CV-340 CV-440B			
XIII.			
VII. G.D. Rodriguez		X. Donald D. Engen	
SIGNATURE OF PILOT		ADMINISTRATOR	
X. DATE OF ISSUE: 09-18-86		VIII.	

AC FORM 8080-2 (1-85) SUPERSEDES PREVIOUS EDITION

FIGURE 3-12-8: Example of a pilot certificate

25. **RATINGS:**

- A. Aircraft category ratings:
 - i. airplane
 - ii. rotor craft, etc.
- B. Airplane class ratings:
 - i. single/multi engine land or sea
- C. Aircraft type ratings:
 - i. large aircraft weighing more than 12,500 maximum gross authorized weight, i.e., DC-3, PV-2, DC-4
- D. "VFR" only (visual flight rules) of "INSTRUMENT AIRPLANE" follows TYPE RATINGS
- E. Instrument ratings:
 - i. airplane
 - ii. helicopter

The pilot certificate is valid until suspended or revoked. A Temporary Airman Certificate, Airline Transport Pilot or Commercial, is accepted provided 120 days have not elapsed since the date of issuance. (See [Figure 3-12-9](#) for a sample of a Temporary Airman Certificate.)

The form is a sample of a Temporary Airman Certificate. It is titled "TEMPORARY AIRMAN CERTIFICATE" and is issued by the "DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION". The form includes sections for personal information (Date of Birth, Height, Weight, Hair, Eyes, Sex, Nationality), ratings and limitations, and signatures (Airman's Signature, Examiner's Signature). It also includes a section for the date of issuance and the date of expiration. The form is labeled "I. UNITED STATES OF AMERICA" and "DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION".

FIGURE 3-12-9: Sample of a Temporary Airman Certificate

26. MEDICAL DATE/CLASS:

- A. A First or Second Class medical certificate is required.
- B. A Second Class medical certificate is valid for 12 calendar months.

- C. A First Class medical certificate expires after 6 months. It is valid for the next 6 months as a Second Class.
- D. The certificate remains valid through the end of the twelfth month. For example, the date of examination in **Figure 3-12-10** is 10/2/95. The medical certificate is valid through 10/31/96.

UNITED STATES OF AMERICA Department of Transportation Federal Aviation Administration						DD.
MEDICAL CERTIFICATE						2ND CLASS
This certifies that (Full name and address):						
GILBERTO D. RODRIGUEZ, JR. 2933 JACARANDA HARLINGEN, TX 78550						
Date of Birth	Height	Weight	Hair	Eyes	Sex	
8-27-35	64 1/2	169	GREY	BROWN	M	
has met the medical standards prescribed in Part 67, Federal Aviation Regulations for this class of Medical Certificate.						
Limitations	"HOLDER SHALL POSSESS CORRECTING GLASSES FOR NEAR VISION WHILE EXERCISING THE PRIVILEGES OF HIS AIRMAN CERTIFICATE."					
Date of Examination			Examiner's Serial No.			
10-2-95			08749-1			
Examiner	Signature					
	[Signature]					
Examiner	Typed Name					
	NOEL LOPEZ, M.D.					
AIRMAN'S SIGNATURE						
[Signature]						
FAA Form 8500-9 (1-91) Supersedes Previous Edition						

FIGURE 3-12-10: Example of a Medical Certificate

27. FLIGHT REVIEW DATE:

- A. The biennial flight review is an FAA requirement.
- B. No person may act as pilot in command of an aircraft unless, within the preceding 24 calendar months he/she has:
 - i. accomplished a flight review given to him/her, in an aircraft for which he/she is rated by a certified instructor; and
 - ii. had his/her log book endorsed by the person who gave him/her the review

- D. Record the date of review on the aircraft/pilot acceptance report. (See **Figure 3-12-11** for an example.)

DATE		MEMORANDUM
19	4-7-93	Mr. Billy F. Turner, holder of Pilot Certificate 1995092, has voluntarily completed flight review required by FAR 61.56(a) on 4-7-93 in a Cessna 306.
		<i>Timothy R. L. 1666668 CFI Exp 3-31-95</i>
	4-21-95	Mr. Billy F. Turner, holder of Pilot Certificate 1995092, has voluntarily completed his flight review required by FAR 61.56 on 4-21-95 in a Cessna 306. It was noted that he has ground school, 916157. <i>Timothy R. L. 1666668 CFI Exp 3-31-95</i>

FIGURE 3-12-11: Example of a flight review

- 29. STATE APPLICATOR LICENSE NO.:** (See **Figure 3-12-12.**)



FIGURE 3-12-12: Example of a State applicator license

30. **TOTAL AG TIME (100 hours minimum):** Ask the pilot. If there is any doubt, check the pilot's log.
31. **STATE APPLICATOR LICENSE EXPIRATION DATE:** Check applicator license.
32. **TOTAL TIME IN TYPE:** Ask the pilot. This is for information only and there are no minimum requirements--if the pilot meets all other requirements/experience, he/she should be accepted.
33. **AGRICULTURAL PILOT LETTER OF COMPETENCY:** (See [Figure 3-12-13.](#))

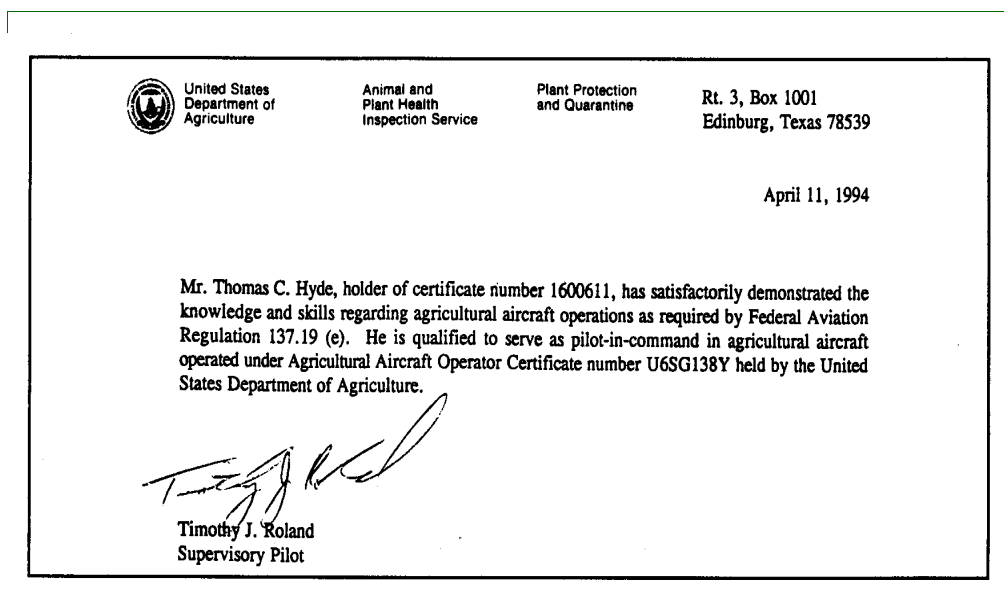


FIGURE 3-12-13: Example of a pilot letter of competency

34. OBSERVATION PILOT LETTER OF COMPETENCY:

- A. Ask pilot for total time and total AG/observation time. A minimum of 1,000 hours pilot time is required in addition to a minimum of 50 hours AG or observation time. This is to ensure that he has enough experience in AG aviation and/or observation that he will not become a safety hazard while performing his duties.
- B. The letter of competency for the observation pilot is the same as that for the AG pilot.

35. REMARKS: Make notes about any discrepancies. Example: Block 26. Pilot's Medical expired. Will renew and bring to COR for verification prior to program start.

36. SPRAY TANK interior cleaned of all contamination: The purpose is to prevent contamination of insecticides and clogging of nozzles by foreign matter.

- A. Climb onto the aircraft wing to inspect the hopper. Do not step on boom or any part of the wing that is not painted with nonskid material to avoid causing damage to the aircraft structure. Be sure to use available handholds to prevent injury to yourself.
- B. Look inside the hopper. It should be clean, dry, and have no foreign matter clinging to the sidewalls. Check for residue of other chemicals dried or caked to the sidewalls. Inspect gaskets and seals--look for bulging or loose sealant compounds that may break loose and plug the spray system.

If the system requires cleaning, advise the contractor. A good cleaning agent such as non-sudsing ammonia or Top Job® and a good scrub brush will remove most residues. If excessive residues are inside the hopper, you should suspect that other parts of the spray system are contaminated also. Corrosive chemicals such as Malathion will loosen most residues and cause plugging of strainers/screens and spray tips resulting in program delays and improper application rates.

37. LEAK PROOF - Check condition of hoses, gate seal and other spray system components: The purpose is to prevent pesticide spills and leaks that will cause damage to the environment and loss of expensive pesticides.

- A. Check hoses for fraying and bulging and that hose clamps are tight.
- B. Check condition of the gate seal--have pilot open gate and check the seal for cuts and fraying.
- C. After the system has been filled with chemical, check for leaks at all connections and spray nozzles. All leaks must be repaired before operations begin.
- D. Check for leaks in the system periodically during the program or after each load, if practical. Also, look at the underside of the fuselage and the tail wheel assembly for chemical. This may indicate a severe leak at the spray pump, gate seal, or other connections while the system is under pressure. It could be evidence that part of the load was jettisoned through the dump gate during the flight.

38. EQUIPPED WITH DUMP VALVE THAT MEETS

AGRICULTURAL PART FAR 137.53 (C)(2): The purpose is to ensure that the hopper load can be jettisoned in an emergency.

- A. a.Aircraft designed specifically for aerial application meet the requirements for FAR Part 137 (Cessna Ag-Truck, Thrush, etc.).
- B. b.Aircraft converted from passenger or cargo certification to aerial application (DC-4, Lockheed PV-2, etc.)--other than helicopters, must be able to jettison at least one-half of the aircraft's maximum authorized load of agricultural chemical within 45 seconds if operating over a congested area. If the aircraft is equipped with a device for releasing the tank or hopper as a unit, there must be a means to prevent inadvertent release by the pilot or other crew members.

39. DRAIN VALVE(S) LOCATED AT THE LOWEST POINT(S) IN THE SYSTEM: The purpose is to allow for complete draining of the spray system at the end of the program or if the aircraft is to

be used for other purposes during the course of the program. Check all low points for drain valves or removable plugs that will allow draining of the spray system. On most Category C and D aircraft, expect three low points; the spray pump, sub-tank, and at the boom "T" or "Y" strainer.

- 40. EMERGENCY SHUT OFF VALVE LOCATED BETWEEN THE HOPPER AND PUMP AND AS CLOSE TO THE HOPPER AS POSSIBLE--ASK FOR A DEMONSTRATION:** The purpose is to prevent loss of pesticide and damage to the environment in the event of a major spray system leak. Look for the emergency shut off valve installed at the proper location. Have the pilot operate it to ensure that it can be closed from the cockpit. Check that the valve closes completely and without difficulty on the pilot's part. It is not necessary for the pilot to be able to open it from the cockpit.
- 41. BLEED LINES INSTALLED ON SPRAY BOOMS WHEN REQUIRED (SEE PROSPECTUS FOR CORRECT INSTALLATION OF BLEED LINES):** The purpose is to remove the entrapped air from the end of the spray boom.
- A.** Use a tape measure and measure from the center of the fuselage to the wing tip and determine the 3/4 position of the wingspan. When an aircraft is equipped with a spray boom that is longer than 3/4 of the overall wingspan and/or the outermost nozzle is more than 3 inches from the end of the spray boom, it will be necessary to install a bleed line. Entrapped air in the boom will cause the nozzles to continue to spray after closing the spray valve until the pressure generated by the entrapped air has bled down to 7 pounds per square inch (psi). A check valve located in the end cap of the spray nozzle will close at 7 psi. Bleed lines need not be installed on spray booms that are equipped with a boom shut off valve located at the 3/4 position provided that valve is closed.
 - B.** Bleed lines will be 3/8 inch inside diameter, and may be constructed from copper or other chemical resistant material. The bleed line should be attached to the end of the boom or to the outermost nozzle port provided the nozzle port is less than 3 inches from the end of the boom. A tee is used to attach the bleed line to the outermost working nozzle positioned at 3/4 or less of the wingspan (PPQ will accept the outermost nozzle anywhere between 60 percent to 75 percent of the wingspan). If a nozzle port is not at the 3/4 wingspan position, use the next available port inside the 3/4 position provided that position is more than 60 percent of the wingspan. To remove the air from the boom, a shut off valve must be installed

between the boom and the bleed line nozzle. This is required to prevent chemical from entering the nozzle without going through the bleed line and thus removing the entrapped air.

- 42. PUMP WITH CAPACITY TO DELIVER 40 PSI TO ALL SPRAY NOZZLES:** The purpose is to ensure that the required pressure can be delivered to all spray nozzles regardless of the chemical and the chemical level in the spray tank. Several types of spray pumps are acceptable on PPQ spray programs. The most common is the centrifugal pump which is usually installed on Category C and smaller agricultural aircraft. The centrifugal pump will pump most materials with minimum wear. Pumps can be hydraulic motor driven (receiving power from the aircraft engine) or wind driven. The wind driven types may have a fixed pitch fan with 2 to 4 blades or a variable pitch fan with 2 to 6 blades. Larger Category A and B aircraft may be equipped with gear or other type pumps. When two pumps are used, they should be connected so that both will pump the insecticide through the total span of the spray boom(s). Individual pumps connected to separate booms should not be accepted because it is difficult to adjust them so that each will pump at the same rate.
- 43. FUNCTIONAL PRESSURE GAUGE WITH A MINIMUM RANGE OF ZERO TO 60 BUT NO GREATER THAN ZERO TO 100 PSI:** The purpose is to ensure that the gauge covers the required operating range and that the scale is not so small that it is hard to read. Look for the gauge mounted in the cockpit or on the spray boom visible to the pilot's view and that it is of the required range. This gauge must also read zero when no pressure is in the system. Liquid filled gauges eliminate needle vibration and allows for a more precise pressure adjustment.
- 44. IN LINE STRAINER - BETWEEN PUMP AND BOOM:** The purpose is to prevent foreign matter from clogging nozzle strainers and spray tips.
- A.** The in-line strainer may be located just after the spray valve or in the "T" at the center of the boom. Check it for cleanliness and that it is of the mesh specified in the contract. For most chemicals, a 50 mesh in-line strainer should be used. Most strainers are not identified as to the mesh size. The mesh size can be determined by marking 1 inch on the strainer and using a small pointed object such as a push pin to count the strands within that inch. A 50 mesh strainer will have 50 strands per inch.
 - B.** Many aircraft spray systems are equipped with a 40 mesh in-line strainer from the manufacturer. Use discretion to accept this 40 mesh strainer if the system is very clean. One

alternative is to obtain a 50 mesh screen, cut to fit the inside of the strainer with overlap, and insert the rolled up section inside the existing strainer.

45. UNUSED NOZZLES REMOVED AND THE OPENINGS

PLUGGED: The purpose is to prevent inadvertent or intentional turning on of excess nozzles. Verify that only the correct number of nozzles is installed for calibration. Excess nozzles must be removed and the openings plugged.

46. SPECIAL EQUIPMENT REQUIRED - I.E., FLAGMAN, SMOKER, DGPS, ETC.:

The purpose is to ensure that all equipment specified in the solicitation is installed and operational. This includes all ground support equipment, such as, pumps, meters, etc. Check to see that the equipment is installed and that it is operational:

- A. To check the smoker without having the pilot fly the aircraft and demonstrate that it is operational, operate the smoker on the ground and listen for the sound of the pump motor. Check that a sufficient amount of smoker oil is on hand supplied by the contractor.
- B. Check that the automatic flagman works by asking the pilot to pop a flag while on the ground and that a supply of flags is on hand.
- C. Check the accuracy of the differentially corrected global positioning system (DGPS) and the pilot's knowledge and skills using the system by utilizing the procedures developed for this test. (Refer to **Aircraft Guidance (GPS)** in the **Program Startup** section for these procedures.) This check will normally be done by a PPQ pilot when available; otherwise, this responsibility lies with the contracting officer's representative (COR).

47. FOR LARGE AIRCRAFT - A METHOD TO DETERMINE THE AMOUNT OF CHEMICAL IN THE HOPPER; IN FLIGHT AND ON THE GROUND:

The purpose provides a method of accurately determining the amount of chemical remaining in the spray tank or hopper. On large aircraft such as DC-4's and etc., a gauge must be installed to verify the amount of chemical remaining in the tank. Most gauges are constructed of a clear chemical resistant hose attached to fittings at the bottom and top of the tank. The marked calibrated divisions should be in increments small enough to accurately determine the amount of chemical remaining in the tank.

48. NUMBER OF NOZZLES INSTALLED FOR CALIBRATION: The purpose is to ensure that the spray aircraft will deliver the desired rate of pesticide per acre. Use the calibration formula in **Aircraft Calibration** in the **Program Startup** section to

determine the correct number of nozzles to install. Refer to **Figure 2-3** to determine the spray tip size required for the aircraft and pesticide being used.

- 49. SPRAY TIP AND STRAINER SIZE, I.E., SS 8002/50 MESH (See prospectus for particular aircraft and tip size):** The purpose is to ensure that the correct size spray tip and tip strainers are installed and constructed from approved materials.
- A.** The solicitation will specify the spray tip size and type (stainless steel, a flat fan, 8002). For most PPQ programs, Aircraft and Equipment Operations (AEO) have determined the correct spray tip size for different aircraft based on airspeed and the pesticide being used. The COR does not have authority to authorize contractors to install spray tips other than those listed for that type aircraft and pesticide. A list of approved spray tips is published in the Federal prospectus under “Aircraft Categories” and in **Table 2-7-1** of this manual.
 - B.** Inspect each spray tip to verify that it is the correct size and constructed of stainless steel (SS) (if SS was specified in the solicitation). Inspect the orifice for evidence of tampering or altering, especially on programs where payment is by the gallon or acre. On programs where payment is by the flight hour, altering the orifice opening is not beneficial to the contractor.
 - C.** Inspect the spray tip strainers to verify that they are installed and of the correct mesh size. The spray tip strainer mesh should be as recommended by the manufacturer. For example, Spraying Systems Company recommends that a 100 mesh strainer be used with spray tips 80015 and smaller and a 50 mesh strainer for spray tips 8002 through 8008. No tip strainers are recommended for orifices 8010 and larger. When using Sevin® 4-Oil, install the 4514-20 slotted strainer, replacing other type strainers.
 - D.** Most spray tip strainers will not be identified as to the mesh size. Use the same procedure as used to determine the mesh size of the in-line strainer; count the number of strands in one linear inch.
- 50. OPERATING BOOM PRESSURE (psi):** The purpose is to document a reference to all involved that the boom pressure is to be set at the psi listed. In most cases, the spray system is calibrated for the boom pressure to be set at 40 psi. However, it may be necessary to reset the psi to achieve the desired flow rate per minute. This may be especially true when applying ULV applications and the calibration requires 8 1/2 nozzles rounded up to 9 nozzles installed on the aircraft. At 40 psi the flow would be too high, thus, a lower psi setting would be in order.

51. **REMARKS:** The purpose is to document discrepancies or remarks. Record any discrepancies or comments and the expected date that discrepancies will be corrected.

CERTIFICATION: (Note this section is not numbered.) Check the appropriate box, acceptable or unacceptable.

52. **OFFICIAL SIGNATURE AND TITLE:** The purpose is a documented record of who performed the inspection. To be signed by the person conducting the inspection and title.
53. **DATE:** This is self explanatory.
54. **PILOT/CONTRACTOR SIGNATURE:** The purpose is a documented record that the contractor/pilot is aware of all records on this document and discrepancies listed. Before the contractor signs this document, review the discrepancies, etc.
55. **DATE:** This is self explanatory.

If a copy machine is available, provide a copy to the contractor and reserve a copy for AEO.

Public reporting burden for this collection of information is estimated to average 25 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Agriculture, Clearance Officer, OPRM, Room 404-W, Washington, D.C. 20250; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503.		FORM APPROVED OMB NO. 0505-0010 EXPIRATION DATE: 11/30/98	
U.S. DEPARTMENT OF AGRICULTURE ANIMAL AND PLANT HEALTH INSPECTION SERVICE PLANT PROTECTION AND QUARANTINE			
AIRCRAFT AND PILOT QUALIFICATION ACCEPTANCE REPORT			
1. PROGRAM <i>Rangeland GH</i>		2. REGION <i>Central</i>	
3. CHECK-IN SITE <i>Bowman, ND</i>		4. CONTRACT NO. <i>SL-9576-2-701</i>	
		5. DATE <i>7-4-96</i>	
6. CONTRACTOR'S NAME AND MAILING ADDRESS (include Zip code) <i>Tim and Billy's Air Flight P.O. Box 2082 Mission, TX 78572</i>		7. REGISTERED AIRCRAFT OWNER'S NAME AND MAILING ADDRESS (include Zip code) <i>Same</i>	
TELEPHONE NO. <i>210-580-7270</i>		TELEPHONE NO.	
8. STATE PESTICIDE REGISTRATION NO. AND EXPIRATION DATE <i>AA-M-201 3-3-98</i>		9. FAA AGRICULTURE OPERATING CERTIFICATE NO. <i>TBAF 84TX</i>	
AIRCRAFT INFORMATION			
10. AIRCRAFT REGISTRATION NO. <i>N 8427V</i>		11. MAKE/MODEL <i>Ayers S-2R T-34</i>	
12. DATE OF ANNUAL INSPECTION <i>3-23-96</i>	13. CATEGORY - A, B, C, or D <i>C</i>	14. SPEED (MPH) <i>135</i>	
15. DATE AVAILABLE <i>7-4-96</i>	16. OBSERVATION AIRCRAFT TIME SINCE 100 HOUR INSPECTION		
17. CHEMICAL <i>Sevin 4-Oil</i>	18. RATE/ACRE <i>16.0 Bl. Oz. per Acre</i>	20. ASSIGNED SWATH <i>150 ft.</i>	
21. PROOF OF INSURANCE <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		22. AIRWORTHINESS CERTIFICATE CATEGORY <i>(Annual 3-23-96) Restricted</i>	
PILOT INFORMATION			
23. PILOT'S NAME AND MAILING ADDRESS (include Zip Code) <i>Timothy Roland 5401 Ponderosa Ave McAllen, TX 78501</i>		24. CERTIFICATE AND NO. (ATP or Commercial) <i>Comm. 26862754</i>	
TELEPHONE NO. <i>210-580-7270</i>		25. RATINGS <i>ASEL</i>	
		26. MEDICAL DATE/CLASS <i>II 2-9-96</i>	
28. TOTAL TIME (1,000 Hours minimum) <i>5000 hrs</i>		27. FLIGHT REVIEW DATE <i>4-21-95</i>	
30. TOTAL AG TIME (100 Hours minimum) <i>4000 hrs</i>		29. STATE APPLICATOR LICENSE NO. <i>ND 0319</i>	
32. TOTAL TIME IN TYPE <i>3900 hrs</i>		31. STATE APPLICATOR LICENSE EXPIRATION DATE <i>12-31-96</i>	
		33. AGRICULTURAL PILOT: LETTER OF COMPETENCY <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
34. OBSERVATION PILOT: LETTER OF COMPETENCY <input type="checkbox"/> YES <input type="checkbox"/> NO		Total time _____ (1,000 hours minimum) Total AG/Observation time _____ (50 hours AG or 50 hours observation minimum)	
35. REMARKS			
PPQ FORM 816 (FEB 95) (Previous editions are obsolete.)			

FIGURE 3-12-14: Example of an Aircraft and Pilot qualification Acceptance Report, PPQ Form 816 (front)

AIRCRAFT SPRAY SYSTEMS ACCEPTANCE INSPECTION		
PLACE AN "X" IN THE APPROPRIATE BOX FOR EACH OF THE FOLLOWING:	YES	NO
36. Spray tank interior cleaned of all contamination.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
37. Leak proof - Check condition of hoses, gate seal and other spray system components.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
38. Equipped with dump valve that meets agricultural part FAR 137.53 (C)(2)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
39. Drain valve(s) located at lowest point(s) in the system.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
40. Emergency shut off valve located between the hopper and pump - ask for demonstration.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
41. Bleed lines installed on spray booms when required. (See prospectus for correct installation of bleed lines).	<input checked="" type="checkbox"/>	<input type="checkbox"/>
42. Pump with capacity to deliver 40 PSI to all spray nozzles.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
43. Functional pressure gauge with a minimum range of zero to 60 but no greater than zero to 100 PSI.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
44. In line strainer - between pump and boom.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
45. Unused nozzles removed and openings plugged.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
46. Special equipment required - i.e. flagman, smoker, DGPS, etc. <i>LORAN C. with Gridnav</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
47. For large aircraft - a method to determine the amount of chemical in the hopper, in flight and on the ground.	<input type="checkbox"/>	<input type="checkbox"/>
48. NUMBER OF NOZZLES INSTALLED FOR CALIBRATION <i>9</i>	49. SPRAY TIP AND STRAINER SIZE, i.e. SS 8002/50 MESH (See prospectus for particular aircraft and tip size) <i>SS 8002 50 mesh slotted</i>	50. OPERATING BOOM PRESSURE (PSI) <i>40 PSI</i>
51. REMARKS <i>Mr. Roland will pilot the lead aircraft in the formation. Only this aircraft will have electronic guidance.</i>		
<p align="center">CERTIFICATION</p> <p><i>I certify that I have completed the above inspections and have noted findings as:</i> <input type="checkbox"/> ACCEPTABLE <input type="checkbox"/> UNACCEPTABLE</p>		
52. OFFICIAL SIGNATURE <i>David C. Hirsch</i>	TITLE <i>PPQ Officer/COR</i>	53. DATE <i>7-4-96</i>
54. PILOT/CONTRACTOR SIGNATURE <i>Tim Roland</i>		55. DATE <i>7-4-96</i>
PPQ FORM 816 (Reverse)		

FIGURE 3-12-15: Example of an Aircraft and Pilot qualification Acceptance Report, PPQ Form 816 (back)

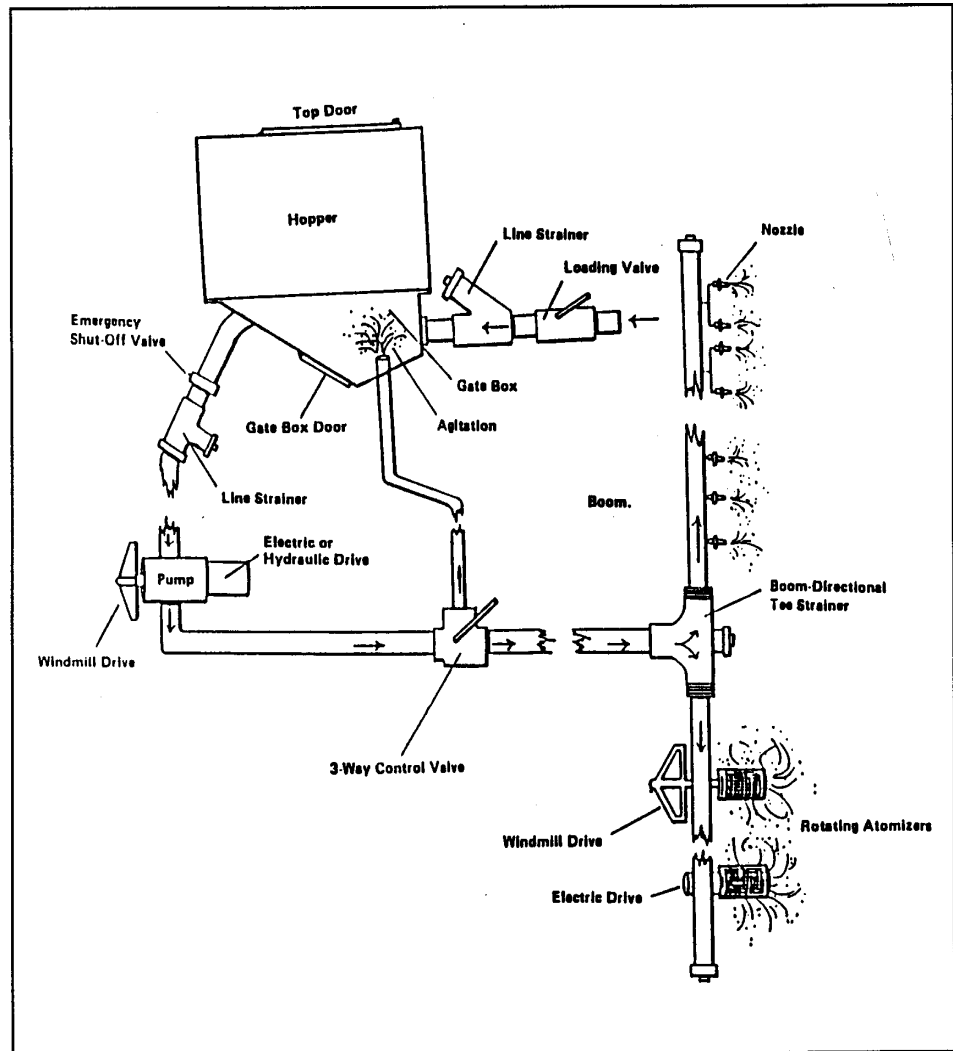


FIGURE 3-12-16: Example of a complete liquid system

3

Aerial Application
Manual

Program Startup

Worksite Organization and Inspection

Contents

Introduction	page-3-13-1
Loading Facilities	page-3-13-1
Liquid Pesticides	page-3-13-1
Granulated Pesticides	page-3-13-2
Grits, Bran, and Rolled Wheat	page-3-13-2
Aircraft Loads	page-3-13-2
Inspection at Worksite	page-3-13-2

Introduction

Proper organization will increase efficiency and reduce accidents at the worksite. Care must be taken when designing the layout of the worksite. Refer to **Pesticide Storage** in the **Program Planning** section.

Inspection of the worksite, identification of problems, and taking corrective action are three steps that should occur at least daily.

Loading Facilities

Dependable facilities for rapidly loading the aircraft will greatly increase program efficiency. Rapid loading may increase the number of loads per day that can be applied, reducing the operational hours required to complete a project. This would mean significant savings on the associated costs of the project benefiting the landowners and taxpayers.

One way to reduce lost time is to give careful consideration to the position of loading stations. The station should be spaced so the aircraft can taxi up to and away from any station and be positioned so the aircraft will not obstruct the runway while it is being loaded.

Liquid Pesticides

Load large aircraft at a minimum rate of 100 gallons per minute and all others at 50 gallons per minute. Pumps, meters, and plumbing should be of sufficient capacity to maintain this loading rate, regardless of the number of aircraft being loaded at one time. Under average conditions, there should be approximately one-third as many loading stations as there are aircraft operating from the airstrip.

Strainers should be incorporated in the loading system so foreign material will not be pumped through the meters and into the aircraft. Foreign material will impair the accuracy of meters, clog nozzles, cause check valves to leak, and cause by-pass valves to stick open.

Loading hoses should be of sufficient length to permit loading aircraft without parking them on a specific spot. Time is lost in parking aircraft at precise locations that may be too close to obstructions.

Granulated Pesticides

Several types of mechanical loading devices can be used to load granulated pesticides into aircraft. Acceptable types are auger, belt, and hopper. Auger and chain-type loaders have been found to be unsatisfactory for clay granules. If it is suspected that a loader is grinding and reducing the size of the granules, a sample of the material should be collected and submitted for size analysis.

Grits, Bran, and Rolled Wheat

Mechanical loaders should be used for loading all large aircraft; belt, chain, and auger types are best. Blowers should not be used for loading bran. When blown into a hopper, bran may pack and thus will not flow uniformly.

Small aircraft can be loaded by hand, provided protective measures are taken to prevent pesticide exposure of personnel and all safety standards shown on the label and provided by the EPA are followed. This is of particular importance when dealing with pesticide dust formulations.

Aircraft Loads

When aircraft loads are computed, each aircraft should be loaded to equal the amount of pesticide required for a specified number of swaths, plus a small cushion or reserve. This ensures that the aircraft will not run out during a swath run. Quite often, pilots may not know where they ran out or, some who may know, may not return to that point to continue applications. This would leave untreated areas.

Inspection at Worksite

Table 3-4 contains items that must be checked periodically as local needs dictate. At least one inspection per day is recommended for items that may change from day to day.

TABLE 3-13-1: Items to Be Inspected

If the item to inspect is:	Then look for the following:
A pesticide storage area	<ul style="list-style-type: none"> ◆ Tanks or barrels arranged on a non-porous surface or impermeable lining used ◆ Spill kit contents and supplies are replaced as they are used ◆ Personal protection equipment is replaced as they are used ◆ No smoking/eating/drinking signs visible ◆ Security measures to exclude unauthorized persons ◆ Pesticide labels and MSDS are available
A containment for pesticide spills	<ul style="list-style-type: none"> ◆ Proper size berms and liners installed around tanks or barrels ◆ Complete spill kit accessible
An aircraft loading area	<ul style="list-style-type: none"> ◆ Easy access to spray planes ◆ Away from other aircraft and traffic areas ◆ Non-porous surface ◆ Security measures to exclude unauthorized persons
An aircraft parking area	<ul style="list-style-type: none"> ◆ Access to loading area ◆ Access to fuel ◆ Security measures to exclude unauthorized persons
A safety item	<ul style="list-style-type: none"> ◆ Spill kits ◆ Protective clothing ◆ Respirators ◆ First aid kits ◆ Fire extinguishers ◆ Pesticide spill and accident information sheet ◆ Work unit hazard information ◆ Training on proper use of equipment to new personnel assigned to the project
An object free area	Make sure equipment is out of this zone around each runway. Refer to Pesticide Storage in the Program Planning section for information regarding the object free area.
A restroom	Available on site
Fresh water supply	Available on site
A garbage container	Available on site

4

Aerial Application
Manual

Program Supervision

Operational Plan

Contents

Introduction [page-4-1-1](#)

Introduction

The following flow chart describes general decisions that Program Managers and COR's must make during daily operations of aerial programs. Operational procedures for each pest program, site specific circumstances and restrictions must also be included in the decision process when developing operational plans (see [Figure 4-1-1](#) for an example of a daily operational plan).

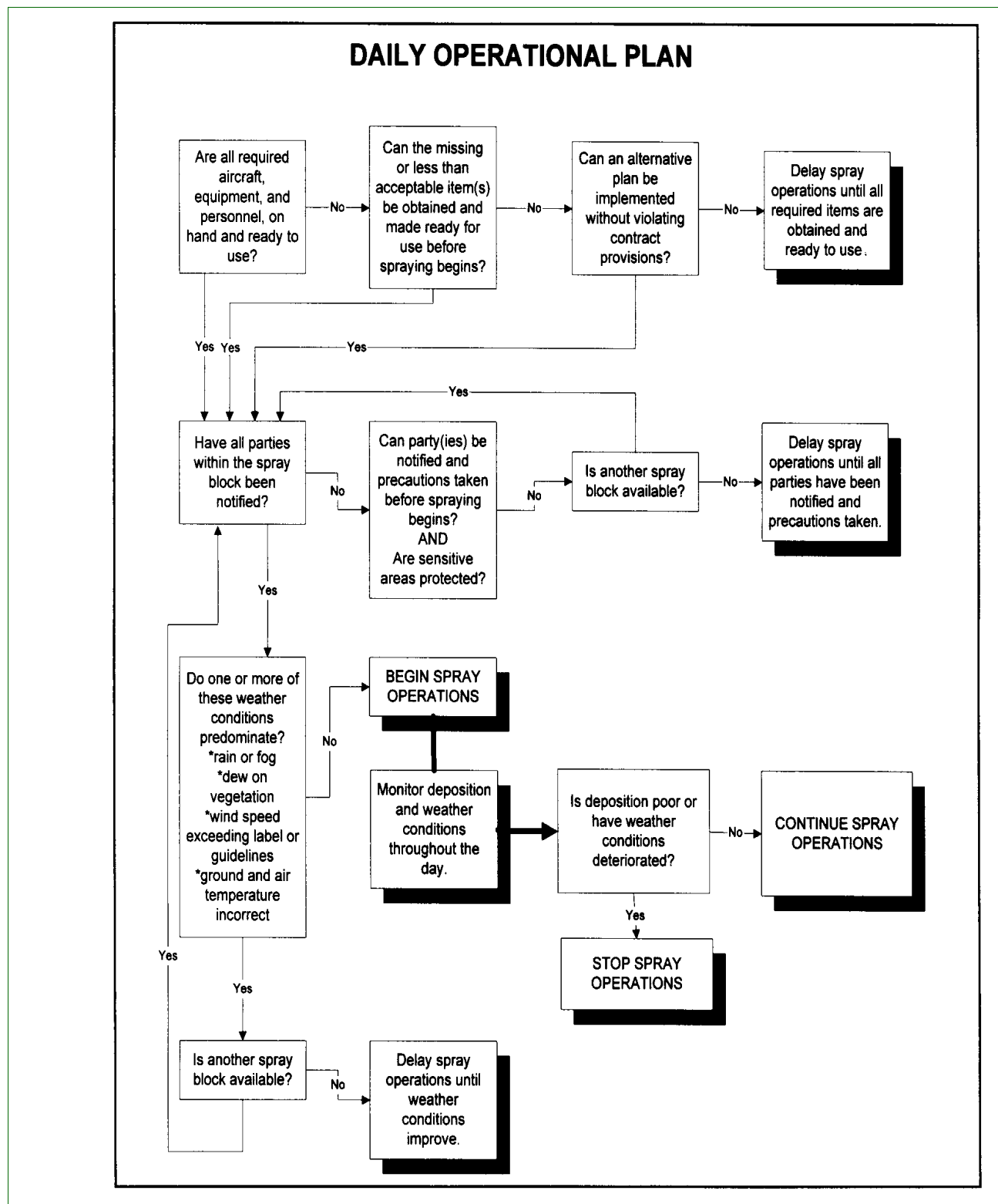


FIGURE 4-1-1: Daily Operational Plan

4

Aerial Application
Manual

Program Supervision

Control Operations

Contents

Introduction	page-4-2-1
Aircraft Assignment and Control Operations	page-4-2-2
Aircraft Assignment	page-4-2-2
Dividing the Area	page-4-2-2
Height of Ferry and Application	page-4-2-3
Formation (Team) Flying	page-4-2-3
General Briefing	page-4-2-4
Pilot Briefing	page-4-2-4
Verifying Spray Block, Sensitive Areas, and Buffer Zones	page-4-2-4
Pilot Experience	page-4-2-4
Terrain Type	page-4-2-5
Flat and Rolling Terrain	page-4-2-5
Rugged Terrain	page-4-2-5
Congested Areas	page-4-2-6
Racetrack Pattern	page-4-2-7
Swath and Swath Checking	page-4-2-7
Crew and Work Assignments	page-4-2-8
Weather	page-4-2-8
Determining Daily Startup	page-4-2-10
Visual Observations	page-4-2-10
Monitoring Spray Deposition	page-4-2-11
Appearance of Dyecards With Various Treatments	page-4-2-13
Environmental Monitoring	page-4-2-16
Determining Daily Shutdown	page-4-2-16
Daily Briefings	page-4-2-17
Program Updates	page-4-2-17
Monitoring Safety Concerns	page-4-2-18
Evaluation of Results	page-4-2-18
Additional Treatments (respray)	page-4-2-18

Introduction

This section presents general guidelines that give a program manager or COR an overview of control activities which they can build on to meet the individual needs of each State or pest control program.

Aircraft Assignment and Control Operations

Aircraft Assignment

When assigning aircraft to treat various blocks, and a choice is available, use the faster, larger load carrying aircraft to treat the blocks farthest from the airstrips. If the terrain is rugged, use the best performing aircraft in those blocks. Assign the more proficient pilots to areas involving rugged terrain. Assignments must be coordinated with the contractor's representative.

Dividing the Area

When areas to be treated involve large or complex areas, require the use of many aircraft, or consist of separated geographic entities, operations usually can be managed more effectively by dividing the areas into units. Large units may require separate supervision/staffing.

The development of the target pest and host plants may vary within the treatment area. The boundaries of the treatment area may need to be divided according to phenological development stages of the target pest and/or host plants. An example of this is gypsy moth development in mountainous areas. The infested area or treatment block boundaries may extend from lower (warmer) elevations up to the higher (cooler) elevations of the mountains. Gypsy moth development is correlated with temperature so egg masses at lower elevations will hatch before, and larvae will develop faster than those at higher elevations.

The ideal target treatment window may occur when the larvae are at the 2nd instar development stage. Work can progress in areas of the treatment block where the larvae are at this stage. As larvae in the higher or cooler areas develop and conform with treatment criteria, work in these areas can begin.

Units should be divided into blocks so the length of the flight lines are appropriate for the aircraft requested or available for the project (see

TABLE 4-2-1: Determine the Length of Flight Lines

If using:	And:	Then use:
Small aircraft	One aircraft	Shorter flight lines
	Two or more aircraft flying in formation	Longer flight lines
Large aircraft		

The use of Kytoons®, light, mirrors, electron, or GPS guidance allows for considerable extension of the flight lines. However, there are limitations other than the guidance system itself. For example, the

chance of adverse weather conditions somewhere along the flight line increases as the line is lengthened. This can cause a reduced work day or poor application over part of the block.

For boundaries, the use of fence flagging is effective and should be posted as needed to ensure accurate application. The use of landmarks such as highways, country roads, railroads, fence lines, telephone and power lines, rivers, trees, brush patches, windmills, buildings, etc., also effectively help pilots locate spray block boundaries.

When it is planned to use more than one aircraft on a program, the blocks must be arranged that the pilots can treat their assigned blocks without danger of collision.

Blocks containing or adjacent to sensitive areas (beehives, poultry or mink farms, water reservoirs, etc.) will be arranged so that flights and turns over them will be avoided or held to a minimum.

Height of Ferry and Application

When dividing blocks, establish aircraft ferry routes, altitude of flight during ferry trips, and height of flight during application. Normal ferry altitude is at least 500 feet above ground level (AGL). Normal application height is based on the wingspan of the aircraft being used. The standard assignment to make is one and one-half of the wingspan length of the application aircraft. Example: A Cessna AgTruck has a wingspan of 41 feet 3 inches. The normal application height is 60 feet.

Formation (Team) Flying

At times it may be desirable or necessary to operate aircraft in formation. This is most likely to occur when a number of small aircraft is used or when there are more aircraft than there are blocks. For this type of flying, use aircraft of similar type, swath width, flow rate, and comparable speed, each carrying equal loads. When pilots have difficulty spacing themselves properly, he/she may be assigned to follow a teammate who is more proficient or experienced.

Flying in formation should be permitted only where **straight flight lines** can be followed. It is too dangerous to fly contours in formation.

There is lower productivity with team flying than when aircraft are working separately because the leading aircraft must make wider turns to permit the trailing aircraft to complete their swath runs. Also, the leading aircraft usually must wait for the other aircraft to be loaded.

General Briefing

Refer to **Daily Briefing and Map Updates** in the **Program Startup** section for a detailed checklist for briefing all program personnel. Hold a briefing session for all personnel, including those of the contractor, before work starts and as often as necessary during the course of the program. Describe the program, its purpose, procedures to be followed, sensitive areas, obstructions or hazards within the area and en route, policy on flight over farms or residences, traffic patterns, minimum ferry altitudes (500 above ground level (AGL)), precautions in handling the pesticide, and other safety measures.

Pilot Briefing

Pilot briefing is best accomplished through the use of observation aircraft so that each can be shown the landmarks, block boundaries, sensitive areas, hazards, etc. Brief each pilot(s) individually on each block assigned. To avoid confusion, do not brief a pilot on more than two blocks at a time, depending on their size.

Verifying Spray Block, Sensitive Areas, and Buffer Zones

After taking a pretreatment reconnaissance flight with the pilots, and confirming that everything is recorded on a master program map, jointly sign and date the map. It is important that the pilot(s) clearly understands where the buffer zones, sensitive areas, and spray block boundaries are at the treatment area.

When observation aircraft are not available, it may be necessary to use ground vehicles to show pilots and/or flaggers their assigned blocks.

If flaggers are used, they should be briefed with the pilots. Discuss the type and number of markers to be used, their location in relation to block boundaries, and other markers that may be in the block. It may be necessary to orient flaggers by means of a reconnaissance flight.

Pilot Experience

All pilots, especially those with minimum experience, should be observed closely during applications to determine whether their work is satisfactory. Any pilot, regardless of the amount of experience, should be replaced if he/she does not perform satisfactorily. Experience alone does not necessarily determine pilot acceptability. A pilot who is not conscientious and capable or has an inappropriate attitude may contribute toward program difficulties.

When electronic guidance is required, use the procedures in **Aircraft Guidance** in the **Program Startup** section to verify the pilot's ability, knowledge, and skills required to operate the system.

Terrain Type

Whenever possible, flat and rolling terrain will be divided into rectangular blocks to enable the pilot to fly straight parallel lines. When boundaries are curved or crooked, pilots are inclined to straighten up the flight lines as treatments progress. This will result in skips and multiple treatment. When feasible, blocks should be aligned with the general direction of most fences and highways, e.g., north-south or east-west on the Great Plains. This aids the pilot in keeping his directions and spacing. Try not to plan east-west flight lines at sunrise/sunset.

Pilots prefer to spray crosswind, start on the downwind side, and work upwind. In this way, they will not fly through the spray from previous swaths. This also protects ground personnel from the spray. Always allow the pilots to participate in flight planning and swath pattern decisions. Pilot safety must always be addressed.

Terrain that is too mountainous or rugged for a pilot to maintain a reasonable altitude over hills and valleys, block boundaries will be designed to follow contours. Pilots are capable of spacing their swaths properly in curving flight lines when they can follow contours.

When practical, rugged terrain areas will be separated for treatment from the rolling or level areas. In rugged areas, wind, turbulence, and other conditions may limit the period of time that treatment can be applied effectively. In such areas, the aircraft would start operations in the early morning and remain until weather conditions become unsuitable and then move to the flat, lower areas.

Flat and Rolling Terrain

In treating flat and rolling terrain, where it is possible to maintain a reasonable altitude without deviating off course, pilots should fly straight parallel lines and cross wind when practical. When spraying, they should begin on the downwind side of the block and move upwind on each progressive swath run so they will not fly through suspended spray from the preceding runs.

Rugged Terrain

In terrain too rugged for straight flight lines, pilots should follow the contour of the slopes. Uphill flying in canyons and valleys is hazardous, as it is difficult for the pilot to judge the degree of the slope. Unless the pilot is flying a powerful, high performance aircraft capable of maintaining the required application altitude and speed, the area should be flown down slope only.

Congested Areas

Blocks adjacent to congested areas should be arranged so aircraft will not fly or make turns over them. Although the term “congested area” has not been defined specifically by the Federal Aviation Administration (FAA), it applies in general to any city, town, community, or group of buildings in which people would be subject to injury as a result of the malfunction of low-flying aircraft. Requirements to treat over congested areas are listed in FAR Part 137, “Treatment Over Congested Areas.” The contractor is responsible to obtain necessary waivers and comply with the regulations.

To minimize the hazard in such areas, FAA places restrictions on aircraft used for treating them. Groups of buildings and very small towns may be treated with a single engine aircraft if it is operated in a pattern and at such an altitude that it can land, in an emergency without endangering persons or property on the surface. Only multi-engine aircraft and helicopters with limited loads can be approved for larger towns and cities. A plan for each congested area operation must be submitted by the contractor to, and approved by, the FAA Flight Standards District Office (FSDO) having jurisdiction over the area where the operation is conducted. A letter of authorization signed by the city or town authorities must accompany each plan. The operator must provide additional documentary evidence relative to aircraft and pilots. Therefore, it is important to state in the bid invitation the approximate percentage of congested area involved so that bidders will be prepared to apply for the waiver well in advance of operations and thus avoid program delays.

Before operating on or near an airport traffic area/control zone (Class D airspace), airport radar service area (Class B airspace), the contractor must notify the appropriate air traffic control authorities. Any operation on or near a military airport must be coordinated with the appropriate military authority. The contractor must obtain permission from an authorized official to use any airport. Obtain radio frequencies used locally. Contact AEO for information and assistance during program planning.

The FAA FSDO, State, county, and local law enforcement agencies must be informed whenever aircraft will be operating at low elevations in areas as described in this section. Complaints of low flying aircraft are usually directed to such agencies. Include a description of the aircraft to be used. Maintain close liaison with these agencies after operations get under way. Advise the contractor to request the local Flight Service Station to issue a notice of airmen (NOTAM) describing dates, times, location, altitude, and aircraft types.

Where possible, plan ferrying and turnaround routes to avoid flights over congested areas, bodies of water, and other sensitive areas that are not to be treated.

Racetrack Pattern

When large blocks are treated, it is sometimes advantageous to set up two parallel flight lines approximately 1 mile apart for aircraft operating at less than 130 mph (113 knots). For aircraft operation above 130 mph the flight lines should be two miles apart if possible. This allows a timesaving 180 degree turn instead of the conventional keyhole pattern necessary with formation flying. In addition, the racetrack pattern lends itself to a safer and less complex procedure turn. This turn reduces pilot work load and facilitates continuous visual contact with the next landmark.

Swath and Swath Checking

Aircraft have been assigned a working swath width as shown in the Federal prospectus under Aircraft Categories. The COR does not have the authority to change these assigned widths for aircraft that are listed. For aircraft not listed, a swath width must be assigned. Contact Aircraft and Equipment Operations for assistance. If a PPQ pilot is not available, the procedures below should be followed.

The best time to swath check an aircraft is when there is very low wind. If there is any air movement, it is important that the aircraft be flown as directly into the wind as possible. The effective swath allowed should be no wider than that which can be obtained in a low-wind condition. When flying cross wind, the spray will drift and cover a wider swath; however, the pilot cannot always fly cross wind conveniently, the wind will not always have the same velocity, and spraying is often done when there is no wind.

Swath checks should be conducted in open areas away from trees or buildings. To set up for swath checks, receptacles, e.g., dyecards, should be placed perpendicular to the direction of flight. More accuracy is obtained when there are sufficient receptacles to place them at 5 feet intervals over a distance at least twice as long as the expected swath width. This is so the total swath can be determined even though the pilot does not fly directly over the center.

To assist the pilot, it is helpful to use two flaggers, or cars with lights on, spaced 50 to 100 yards apart, aligned so the pilot will fly over the center of the card line. The pilot should be instructed to line up with the markers far enough away so the aircraft will be in level flight, at cruising speed, and at the required height when the spray is turned on. Turn on the spray at least 500 feet before reaching the receptacles and leave it on about 1500 feet beyond. After turning off the spray, the

aircraft should continue flying straight and level for another 10 to 15 seconds. Abrupt pull-ups, or turning too soon, will distort the deposit pattern. The aircraft should remain away from the swath recovery area at least 15 minutes to allow the spray to settle.

Flying at a height equal to the wingspan usually produces the widest, most effective swath. Flying at a height less than the wingspan, or with a spray boom less than two-thirds of the wingspan, usually produces a narrower effective swath. However, flying at a height much greater than the wingspan, or with nozzles spaced throughout the full wingspan, does not increase the swath appreciably.

When the aircraft will be operated at a height about equal to the wingspan, nozzle spacing should be generally uniform (symmetrical) along the boom.

Crew and Work Assignments

Ensure that all aircraft, equipment, and personnel are ready. Distribute equipment and radios to project personnel and provide the necessary training for their work assignments. Establish a daily operational plan with input from the ground crew and the pilot(s). Monitor daily work assignments of APHIS and cooperating personnel. Meetings and briefings are useful to identify problems, provide progress reports to personnel, adjust work assignments, and provide additional training. Refer also to **Briefings** in the **Program Startup** section and **Duties of Program Personnel** under the **Program Planning** section.

Weather

Weather plays an important part in aerial application. Winds may displace the pesticide within the target area. High temperatures, combined with low humidity, may cause fine liquid pesticides to evaporate or drift away without reaching the target.

Have trained personnel monitor weather conditions before and during application. Have them record wind speed and direction, air and ground temperature, cloud formation, and fog. Weather readings are critical to effective applications and should be taken frequently for ultra-low-volume formulations. Weather monitoring should occur in the treatment block for more accurate readings. These weather monitors must be able to communicate with the COR at all times. Refer also to **Duties of the Ground Observer** under **Personnel, Materials, and Equipment** in the **Program Planning** section.

When applying ULV formulations, control activities should stop when it appears that weather conditions could jeopardize safe placement of the spray on treatment areas. To minimize drift and volatilization, do not use ULV formulations when any of the following weather conditions exist:

- ◆ Wind velocity exceeds 10 mile per hour (unless a lower wind speed is required for application under State law or pesticide label requirements).
- ◆ Air turbulence that could seriously affect the normal spray pattern.
- ◆ Rain is falling or is imminent.
- ◆ Fog is present or is imminent.
- ◆ Heavy dew is on foliage.
- ◆ Temperature changes could cause the spray to move outside of the treatment block.

Also, the following visual signs detected by field observers can indicate poor weather conditions for applying liquid sprays:

The chemical begins to rise instead of falling to the ground (inversions).

- ◆ Excessive drift occurs.
- ◆ Soil and Air Temperature

Special consideration must be taken for monitoring the air and ground temperature difference when using liquid ULV formulations. This is one of the critical indicators of when it is time to quit spraying for the day. The best weather for spraying is usually from dawn until mid-morning. As the morning progresses, inversions occur when the soil warms the air above it. As the soil surface warms, the air above it begins to rise. When the soil temperature and air temperature equalize, the upward air currents (thermals) increase and cause the fine pesticide droplets to float or even begin to rise as they near the ground. If droplets float or rise, pesticide drift off site is more likely as well as reduced efficacy due to pesticide not reaching the target. Consistent monitoring of the spray deposit pattern on dye cards and air and ground temperature are the best methods of determining the effects of weather factors. When weather inversions occur, consider terminating application for the day.

The soil temperature should be taken by placing the thermometer probe on an unshaded site; then shade the thermometer for 3 minutes before reading. Air temperature should be taken 5 feet above the surface, in the open but with the thermometer shaded.

Bait formulations such as wheat bran and other solid materials such as pheromone flakes are not as sensitive to air and ground temperatures. These formulations can be applied throughout the day except for rain or high winds.

Determining Daily Startup

Prior to allowing application aircraft to be loaded or leave the airport, contact all ground observers and the aerial observer. Confirm with them that all personnel are in place and weather conditions are within tolerances for aerial application of the material being used.

Unless the program is an emergency, it is advisable not to plan applications in the evening. When evening operations are planned, it is important to know at what time it may be too dark for safe operations. No pilot should be permitted to take off with a load without assurance of adequate time to complete the round trip before dark. Even though the airport may be lighted for safe landing after dark, there must be adequate daylight to do satisfactory application work. Most projects using liquid formulation begin at first light at daybreak until the soil temperatures rise above the air temperature (usually mid morning). Daily operation times for programs using baits and flakes are more flexible because the materials are less sensitive to temperature.

Visual Observations

Ground and aerial observers must monitor or perform visual inspections of many aspects of aircraft and pesticide performance during operations.

Observers should be aware of the following elements and record or report them to the Contracting Officer's Representative (COR).

Pesticide Deposition

Swath Displacement—The swath is the width of the effectively treated area when a ground rig or application aircraft makes one trip across a field. Displacement is the distance that the swath is offset from the center line due to a crosswind.

Drift—The movement of pesticide formulation by wind, air currents, or volatilization outside the intended area, usually as fine droplets, during or shortly after application.

Swath Spacing When Formation Flying—When aircraft are arranged in formation to treat a block, they must be spaced the proper distance from each other. The swath for each aircraft must not overlap. Also, no space or skips should be left between patterns.

Application Aircraft

Uniformity of Spray Pattern—The pesticide formulation should be applied as evenly as possible over the width of the swath and over the whole area.

Skips—Areas within the control block that did not receive treatment due to poor aircraft guidance, pilot error, or running out of chemical in the aircraft.

Plugged Nozzles—Notify the COR and the airport supervisor of any nonoperating nozzles, nozzles that operate intermittently, or have only partial output. Identify the aircraft by number. Incorrect operating nozzles affect calibration and reduce efficacy. Significant variance in boom timer readings may also indicate plugged nozzles.

Height of Flight—Identify aircraft that are flying at other than the assigned height.

Proper Shut Off and Turn On—Verify that aircraft are opening and closing the spray boom or bait spreader at the proper boundaries and over sensitive areas. Watch for “positive” nozzle shutoff. Verify that nozzles do not “trail off” or continue to operate after the boom has been shut off. This could be caused by inadequate, plugged, or improperly installed bleed lines on the spray boom.

Turnarounds—Verify that aircraft complete their turn prior to reentering the treatment block. The aircraft should be level, on track, and at cruising speed as it begins each pass.

Insecticide Dumps—Immediately report any accidental release, leak, or intentional dump of pesticide. The time and location of the dump should be recorded, secured, and reported to the COR and airport supervisor.

Weather Conditions—Record and report weather conditions as described under **Weather** under **Control Operations** in the **Program Supervision** section. Periodic reports to the aerial observer or COR need to be clearly and accurately communicated.

Monitoring Spray Deposition

The use of dyecard samplers is the best way to monitor spray deposition. Dyecards are water or oil sensitive paper that is used to provide valuable information on swath width, spray deposit pattern, droplet size, and to identify leaks in the spray system. When systematically placed, the dyecards can verify the nontreatment of sensitive areas and other areas not targeted for treatment. It is important to maintain cards as part of the program file.

- ◆ Position Dyecards
 - ❖ Place at regular intervals.
 - ❖ Spacing depends on size of block, sensitive sites, and time allowed.
 - ❖ Tack to tops of a fence post, stakes, or other devices to hold them above vegetation.
 - ❖ Identify them with a code or number for record keeping purposes.
- ◆ Recover Dyecards
 - ❖ Dyecards should be picked up in the same order they were laid down.
 - ❖ Wait at least 15 minutes after the spray aircraft have left the area before retrieval. This should allow ample time for the pesticide formulation to reach the target area.
 - ❖ Use adequate card holder to prevent smearing of the dyecard.
- ◆ Record the Following Information on Card Batch
 - ❖ Name and location of place pesticide was used
 - ❖ Target pest
 - ❖ Site to which applied, i.e., cotton field
 - ❖ Year, month, day, and time of application
 - ❖ Trade name and EPA registration number of pesticide
 - ❖ Amount of pesticide used and its formulation, i.e., Malathion ULV concentrate, 8.0 fluid ounces per acre
- ◆ Evaluate the Deposition Pattern on the Dyecards

Appearance of Dyecards With Various Treatments

Figures 4-3, through **4-6** show examples of how dyecards appear with various treatments.



FIGURE 4-2-1: Dyecard showing an acceptable deposition pattern of Malathion ULV concentrate at an 8.0 fluid ounce per acre rate

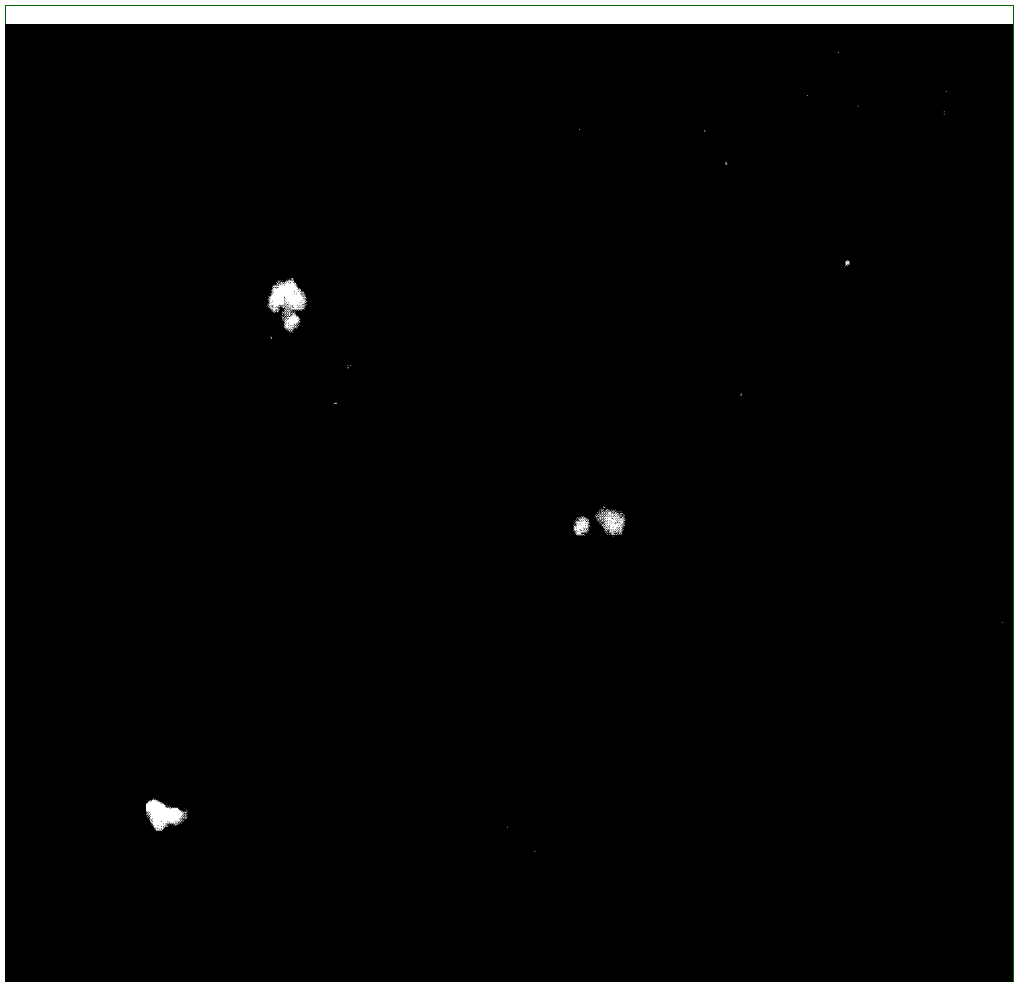


FIGURE 4-2-2: Dyecard showing typical deposition pattern with a leak in the spray system

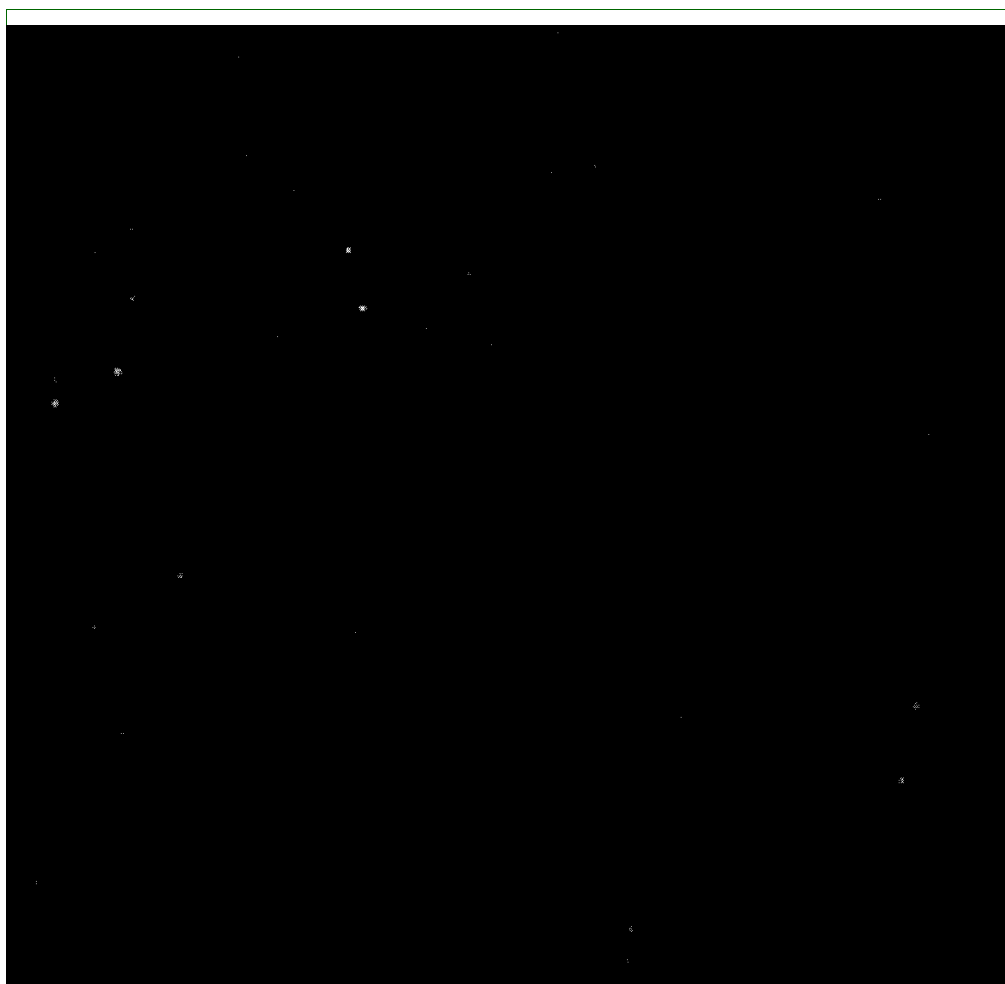


FIGURE 4-2-3: Dyecard showing an acceptable deposition pattern for Sevin 4® Oil at a 20.0 fluid ounces per acre rate

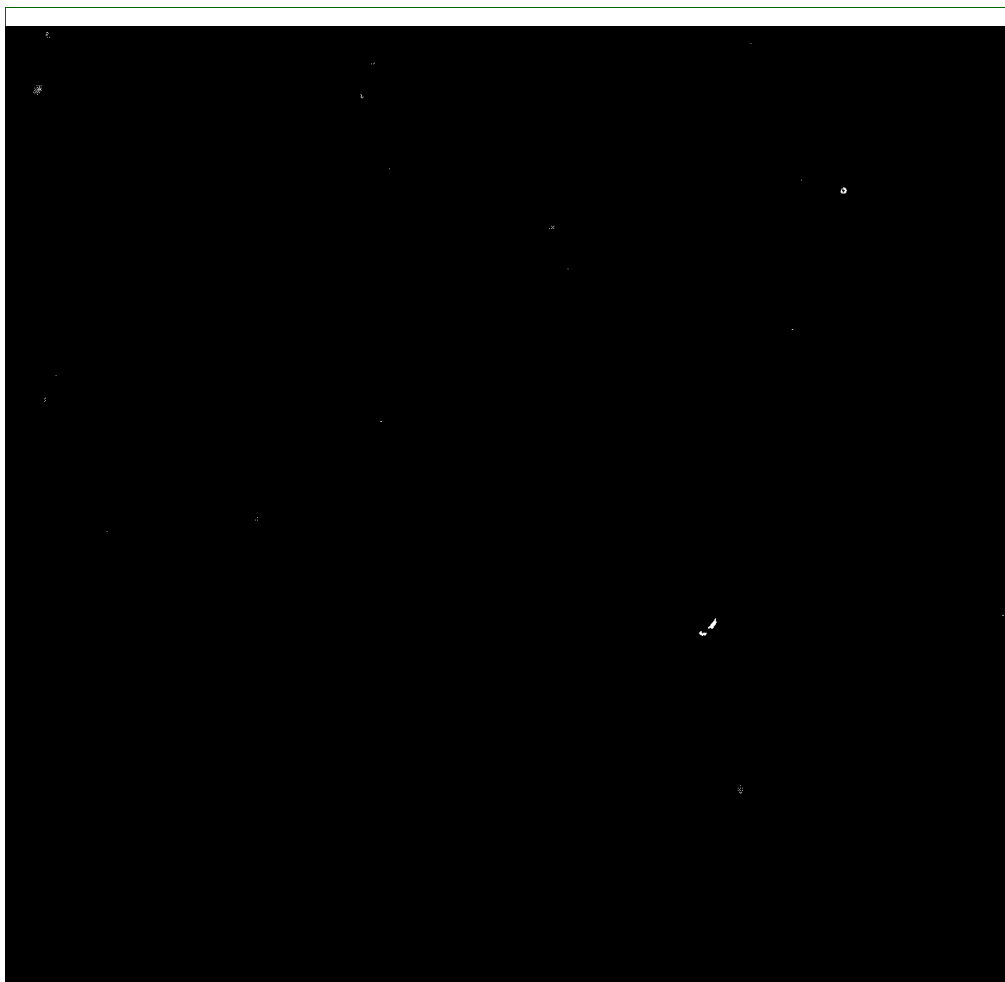


FIGURE 4-2-4: Dyecard showing typical deposition pattern for Sevin 4® Oil at a 16.0 fluid ounces per acre rate

Environmental Monitoring

Ensure that environmental monitoring (if required) is set up in the proper locations and personnel are equipped and in communication. Samples must be drawn according to the Environmental Monitoring Plan for the pest program or site specific circumstances. Environmental monitors must be coordinated with treatment operations in order to carry out their duties. Refer to **Environmental Monitoring** in the **Program Planning** section.

Determining Daily Shutdown

The COR determines when to shut down daily activities with input from the aerial observer, ground observers, and contractor personnel.

Items to consider when determining shutdown are the following:

- ◆ Weather conditions
- ◆ Spray deposition
- ◆ Safety concerns such as turbulence, wind-shear, and pilot fatigue

Daily Briefings

Conduct a briefing at the end of the day with all program personnel, contractor personnel, or any combination of persons, depending on the need to communicate problems with the current day's activities, and to plan the next day's program activities. Use these briefings to resolve differences in the area that has been treated according to aerial observers and the pilots of the application aircraft. Mark the program map where treatment was stopped for the day and where the application will begin the next day. Refer to **Daily Briefing and Map Updates** in the **Program Supervision** section for more information.

Program Updates

Make daily progress reports to the program manager, State Cooperator, landowner chairperson, and/or extension agent, as appropriate. In summary the program update includes the following information:

- ◆ Acres treated
- ◆ Gallons sprayed
- ◆ Gallons remaining
- ◆ Contractor performance
- ◆ Problems/concerns/solutions
- ◆ Other required information specific to the program or State

Report these events, and update logs as they occur:

- ◆ Accidents involving aircraft, vehicles, personnel
- ◆ Pesticide spills and/or pesticide jettison from application aircraft
- ◆ Request of additional supplies
- ◆ Restraining orders
- ◆ Threatened lawsuits
- ◆ Unusual complaints or phone calls requiring further investigation

- ◆ Gunshots and/or bullet holes in aircraft
- ◆ Vandalism

Additionally, maintain and update all records, logs, and the master program map. Update pesticide supply records comparing the calculated amount of pesticide to the actual amount used.

Monitoring Safety Concerns

Monitor safety aspects of the control program operations including:

- ◆ Aircraft and pilots
- ◆ Ground personnel
- ◆ Airport and pesticide storage
- ◆ Spill kits
- ◆ Personal protective equipment
- ◆ Vehicle safety

In addition, verify that all personnel are getting adequate rest. Aerial control projects are physically demanding in difficult conditions, and often require overtime hours. Program personnel that are tired or drowsy are a hazard to themselves and others.

Refer to **Safety** and **Worksite Organization and Inspection** in the **Program Startup** section for more detailed information.

Evaluation of Results

Thoroughly check the results of aerial application. Contracts usually require the contractor to retreat skips or inadequately treated areas at the contractor's expense. Daily checks should be made to determine promptly whether all areas are treated satisfactorily. Refer to **Mortality Assessment** in the **Program Planning** section.

Additional Treatments (respray)

Pesticide labels will contain information on the maximum number of applications allowed and the length of time (if any) required to wait prior to applying additional treatments to an area. Additional expenditures for respraying may be prohibitive or not cost effective. Consult pest program managers, guidelines, manuals, and/or environmental impact statements for policies on respraying areas.

4

Aerial Application
Manual

Program Supervision

Bran Bait/Aerial, Bran Bait/Ground

Introduction

A bait formulation is an active ingredient mixed with food or another attractive substance. The bait attracts the pests, which are then killed by eating the pesticide it contains. The amount of active ingredient in most bait formulations is quite low, usually less than 5 percent.

In some situations (habits of the pest, environment sensitivity, etc.), the use of wheat bran bait is an effective alternative to liquid pesticides. Baits are commonly used in Mormon cricket and grasshopper control programs. Baits can be applied by aerial and ground equipment.

Appendix 7 is reserved for the reprint of information contained in the Grasshopper Integrated Pest Management User Handbook. The chapter will describe application equipment, calibration techniques, management issues, and options.

4

Aerial Application
Manual

Program Supervision

Contractor Actions

Contents

Introduction [page-4-4-1](#)
Monitoring Contractor Actions [page-4-4-1](#)
PPQ Form 817 [page-4-4-3](#)

Introduction

Monitoring contractor performance is an ongoing task throughout the control program. Contractor's have many different responsibilities. Frequency of inspections of equipment and monitoring of contractor actions range from continuously to per load, or daily.

The Aerial Contractor Performance Evaluation Report (PPQ Form 817) must be completed by the Contracting Officer's Representative (COR) following the completion of each contract. Copies of the form should be distributed as indicated in the lower right hand corner. These forms are used to determine if the contractor has met contract specifications and if they should be considered for future contracts. The form may also be used by the contracting officer (CO) as documentation for assessing liquidated damages or giving the contractor extra consideration in future contracts because of outstanding service.

Monitoring Contractor Actions

Notes on contractor actions, results of inspections, and action(s) taken should be entered into the program daily logs. These notes are important for completing PPQ Form 817 (see [Figure 4-4-1](#) for an example).

The following tables list elements to inspect or monitor during a control program. Other elements should be added to the list that addresses local conditions or circumstances. Refer to **Safety** in the **Program Startup** section, **Pesticide Storage** in the **Program Planning** section, and **Worksite Organization and Inspection** in the **Program Startup** section.

Pesticide Applicator

TABLE 4-4-1: Pesticide Applicator Elements to Inspect or Monitor During Control Program

Element to Monitor:	Frequency:	How Monitored:
Acres treated	Per load	Meter, program maps, boom timer, and calculations
Gallons dispensed	Per load/ Daily	Total all load amounts for the day using the Daily Aircraft Record (PPQ Form 802)
Deposition	Per load	Dye cards and visual observations
Leaks or pesticide dumps	Per load	Observation of dispersal equipment by all observers and dyecards
Total operational hours	Daily	Record aircraft downtime on daily aircraft records
Has contractor left airport in good order after operations are completed	Before contractor is released	Compliance inspections performed by the COR and airport authority

Airport Operations

TABLE 4-4-2: Airport Operation Elements to Inspect or Monitor During Control Program

Element to Monitor:	Frequency:	How Monitored:
Pesticide spills, leaks	Per load	Observation by Airstrip Supervisor, COR, Time keeper
Garbage	Daily	Observation by Airstrip Supervisor, COR, Time keeper
Safety hazards	Continuously	Observation by Airstrip Supervisor, COR, Time keeper

Personnel

TABLE 4-4-3: Personnel Elements to Inspect or Monitor During Control Program

Element to Monitor:	Frequency:	How Monitored:
On time for daily startup, briefings	Daily	Daily contacts with personnel by COR
Work performance and attitude	Daily	Daily contacts with personnel by COR

Aircraft and Equipment

TABLE 4-4-4: Aircraft and Equipment Elements to Inspect or Monitor During Control Program

Element to Monitor:	Frequency:	How Monitored:
Meet contract specifications and required type and number available	Daily	Compliance inspections performed by the COR or Program Manager

PPQ Form 817

The following is an example of a completed Aerial Contractor Performance Evaluation Report (Jan 92). Be sure you are using the current version.

UNITED STATES DEPARTMENT OF AGRICULTURE ANIMAL AND PLANT HEALTH INSPECTION SERVICE PLANT PROTECTION AND QUARANTINE		
AERIAL CONTRACTOR PERFORMANCE EVALUATION REPORT		
SECTION I		
1. CONTRACTOR'S NAME AND ADDRESS (Include Zip Code) <i>Tim and Billy's Air Flight P.O. Box 2082 Mission, TX 78572</i>	2. PROGRAM <i>Boll Weevil Eradication</i>	3. CONTRACT NUMBER <i>56-9346-2-701</i>
SECTION II		
INSTRUCTIONS: Place an "X" in column A. or B. as appropriate for each performance standard. If a standard does not apply, indicate with N/A in column A.		
PERFORMANCE STANDARDS	A MEETS FULLY SUCCESSFUL	B DOES NOT MEET FULLY SUCCESSFUL
1. Obtaining the necessary FAA, State, and all other required clearances including certification as an applicator of restricted-use pesticides (certified pesticide applicator) if required.	X	
2. Pilots obtaining the proper certification for agricultural flying prior to the starting date.	X	
3. Strict adherence to all EPA and State approved label instructions for chemicals, biological pesticides, biological materials, and compliance with all applicable Federal, State, and local environmental laws and regulations in performance of the contract.	X	
4. Contractor's personnel reporting to work on time daily and remaining on the job until officially released.	X	
5. Contractor reporting on date as directed and providing all required equipment, personnel, and facilities.	X	
6. All equipment meeting contract requirements. <i>Fire extinguishers not current</i>		X
7. Avoiding repeated delays caused by malfunction of equipment or delays in loading between trips, which affect the total overall length of time in performing the contract.	X	
8. The Contractor utilizes and fosters good safety habits and attitudes. <i>Personnel needed constant reminder of No Smoking zones</i>		X
9. The contractor will select the airport(s) to be used and make the necessary arrangements with proper authority for:		
a. The use of each airport.	X	
b. The payment of any fees charged for its use.	X	
c. The payment for repairs or damages that result from the Contractor's aircraft, equipment, or contamination from pesticides.	X	
d. Maintaining the areas used by the Contractor in a clean and orderly fashion during their use and cleanup after use, to the satisfaction of the Contracting Officer Representative (COR). <i>Left Garbage</i>		X
10. Claims for damages brought against the Contractor concerning aerial application or any other operations have been addressed in a fair and timely manner.	X	
11. All required action has been taken for any pesticide spillage with regard to notification and cleanup.	X	
12. All operational guidelines and adherence to buffer zones required by the prospectus and any additional buffer zones specified by the COR were followed.	X	
SECTION III		
1. Should this contractor be considered for future contracts? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO If NO, provide justification and documentation when submitting the evaluation reports to the Contracting Officer.		
2. SIGNATURE OF OFFICER-IN-CHARGE <i>Bob Wilson</i>	3. DATE <i>7-4-96</i>	
PPQ FORM 817 (JAN 92)	PART 1 - FIELD SERVICING OFFICE MINNEAPOLIS, MINNESOTA	

FIGURE 4-4-1: Example of an Aerial Contractor Performance Evaluation Report (PPQ Form 817)

4

Aerial Application
Manual

Program Supervision

Daily Aircraft Record (PPQ Form 802)

Contents

Introduction [page-4-5-1](#)
Distribution [page-4-5-2](#)
Instructions for Completing the Form [page-4-5-2](#)

Introduction

The Daily Aircraft Record (PPQ Form 802) (see **Figure 4-8** for an example) is a legal, written record of spray operations for a given day. Accurately complete all items on the form. Be sure to record, (under Comments), all periods any aircraft is not operational and the reason therefore. Distribute copies in accordance with instructions on the lower right hand corner of each sheet except as follows: The original should be forwarded to FSO and attached to APHIS Form 329. In those cases, or upon request for the CO, the original should be sent to the CO. PPQ Form 802 should be signed by the contractor's designated representative and the timekeeper at the end of operations each day. Payments to the contractor are based on information entered on these forms.

A separate PPQ Form 802 should be completed for the observation aircraft.

Should the contractor or his/her representative disagree with comments listed on the PPQ Form 802, "signed under protest" may be entered on the form. If the subject is controversial, the versions of both the COR and the contractor's representative may be written on the reverse side of the PPQ Form 802. If the versions are lengthy, they may be written in the Comments section of the form and continued on the back of the form. Then the CO should be immediately contacted.

As each aircraft is released from the program, note this on the last PPQ Form 802 for that aircraft and record the release in the Daily Log. This will provide a complete record of each aircraft and will account for all work days.

If one or more aircraft are released under the "Termination for Convenience of the Government" section of the contract, the CO must be notified immediately by telephone.

PPQ Form 802 provides for one application aircraft and/or observation aircraft on each form. Under current operation conditions, an aircraft seldom makes 10 flights per day. If more than 10 flights are made in one day, completely fill out an additional form and continue the flight numbering sequence and make a notation in the Comments section.

Distribution

Distribution of PPQ Form 802 follows:

Part 1 (white) Original:	Field Servicing Office (accompanied by APHIS Form 329)
Part 2 (pink):	Application contractor
Part 3 (green):	Office copy
Part 4 (yellow):	Aircraft and Equipment Operations

Instructions for Completing the Form

Enter the following information in the corresponding block.

1. **Date:** Enter today's date of the record. If spray operations were canceled for some reason such as weather, complete a form for that date and note the reason in the comment section.
2. **Contract No.:** Enter the contract number received from FSO.
3. **Pest:** Enter the pest or program.
4. **State:** Enter State.
5. **County:** Enter county or counties where treatment was conducted.
6. **Block:** Enter the designated name of the treatment block.
7. **Contractor's Name and Mailing Address:** Enter complete information. Refer to the contract.
8. **Pesticide:** Enter the name and formulation of the pesticide being used. Example: Sevin 4®-Oil, Fyfanon ULV®.
9. **Application Rate/Acre:** Enter rate being used. Example: 20.0 fl. oz. per acre.
10. **Application Aircraft Make/Model:** Refer to the Federal prospectus. Example: Cessna 188, 600 hp Thrush, Turbine Air Tractor.

11. **Registration No.:** Enter the “N” number as found on the application aircraft.
12. **Observation Aircraft Make/Model:** Use this block only if the form is being used to record information for the observation aircraft. Record the make and model (Example: Cessna 182, Mooney 201). Do not record observation aircraft information on the same form as the application aircraft.
13. **Registration No.:** Enter the “N” as found on the observation aircraft.
14. **Tachometer or Hobbs Meter (Start):** Record the reading (in hours) when the observation aircraft begins the trip. Be sure to include the tenths and hundredths digits.
15. **Tachometer or Hobbs Meter (End):** Record the reading (in hours) when the observation aircraft finishes the trip or for the day.
16. **Total Hours:** Subtract line 14 from line 15 and record the time (including tenths and hundredths). This figure is used to calculate payment to the contractor.
17. **Trip No.:** Record the trips in sequence of the application aircraft.
18. **Take Off Local Time:** Record the time the aircraft takes off from the airstrip.
19. **Landing Local Time:** Record the time when the aircraft returns to the airstrip or parking area, or the reloading area.



Take off and landing time is considered when full power is applied for the purpose of take off and landing when the aircraft comes to a stop at the refueling or loading site.

20. **Hrs. & Mins.:** Enter the elapsed time the trip lasted.
21. **Take-Off Gals./Lbs.:** Record the number of gallons/pounds of pesticide loaded on the aircraft. This is the number taken from the meter in the loading process or the total weight of dry material.
22. **Landing Gals./Lbs.:** Record the number of gallons/pounds of pesticide remaining in the aircraft after returning from a trip.
23. **Applied Gals./Lbs.:** Subtract block 22 from block 21 and record.
24. **Acres:** Total acres treated for that trip.
25. **Remarks:** Record any pertinent details regarding the trip, such as landing due to plugged nozzles, weather, etc.
26. **Total Gals./Lbs. Loaded on Aircraft:** Add the column of take-off gallons/pounds and record the total.

27. Total Gals./Lbs. Drained or Remained on Aircraft: Record the number of gallons/pounds of pesticide remaining or taken off the aircraft at the end of the day or end of the project.

28. Total Gals./Lbs. Applied and Acres Treated: Add the column of applied gallons/pounds and record the total.

Comments: Record any pertinent information or explanations in this section. Examples of comments would be leaks, aircraft pesticide jettison, unsafe practices, protests. Continue on the back of the form if more room to write is needed.

29. Signature of Timekeeper: Sign each day.

30. Signature of Application Contractor's Representative: Sign each day.

4

Aerial Application
Manual

Program Supervision

Daily Briefing and Map Updates

Contents

Introduction	page-4-6-1
Daily Briefings	page-4-6-1
Preparing for the Briefing	page-4-6-1
Conducting the Briefing	page-4-6-1
Maintaining the Master Program Map	page-4-6-3

Introduction

Daily briefings should be conducted to ensure updated information is being exchanged by all program personnel. Decision making, supervision of pilots and program personnel, and coordination of project tasks can be facilitated by holding briefing meetings. Information on conducting briefings and topics to discuss with all program personnel are found in **Briefings** and **Program Orientation** in the **Program Startup** section.

Daily Briefings

In addition to the items discussed in preceding sections, the following items should be reviewed on a daily basis with pilots and contractor personnel.

Preparing for the Briefing

1. Inform contractor's representative of time, location, and persons required to attend the meeting.
2. Meet with airport supervisor, aerial observer, and ground personnel to update the daily log and discuss any problems with the contractor's performance. Have any or all of these personnel attend the meeting as required.

Conducting the Briefing

1. Indicate the spray block(s) or portions of block(s) completed on the master program map.
 - A. Mark starting and stopping points, and any skips.
 - B. Shade in completed areas.
 - C. Compare the amount of actual pesticide used with the acres sprayed according to the master program map.

2. Discuss any problems with today's operation concerning:
 - A. Skips
 - B. Deposition on sensitive areas
 - C. Swathing
 - D. Drift
 - E. Droplet size
 - F. Clogged nozzles
 - G. Pesticide spills
 - H. Unreasonably long or sloppy reloading/refueling
 - I. Other contractor performance not meeting contract requirements
 - J. Safety concerns or procedures not being followed
 - K. Site specific issues that need to be addressed
3. Plan tomorrow's spray operation:
 - A. Decide how the weather forecast affects the operational plan.
 - B. Decide on a starting time.
 - C. Let the pilots participate in determining how the blocks will be flown. Document that:
 - i. All parties in the spray block have been notified.
 - ii. Pilots are aware of landmarks, hazards, and restricted military areas.
 - iii. Plans are in place to protect sensitive areas.
 - iv. Ground observers (scouts, flaggers, etc.) are informed of:
 - direction of the flight
 - exact starting point
 - location of access roads
 - location of landmarks, hazards, nontarget, restricted, and sensitive areas

When determining daily assignments and planning spray operations, a reconnaissance flyover of the spray block with the pilots is desirable when the spray block is characterized by one or more of the following:

- ◆ Rough terrain
- ◆ Aerial hazards
- ◆ Sensitive areas located inside or adjacent to the spray block
- ◆ Uneven boundaries

Maintaining the Master Program Map

During the daily briefing, use the opportunity to get input from program personnel for updating the master program map. The following guidelines can be used to chart program progress and to check accuracy of calibration error or alert Program Managers of potential pesticide shortages. These guidelines will work for large programs but can be modified for smaller blocks.

1. Ask the pilots to mark the exact starting and stopping points for the sprayed area(s) completed that day.
2. Indicate skips in the spray block if a substantial number of acres is involved.
3. Draw lines connecting the corners to enclose the completed spray area(s).
4. Color or "line" in the spray block to indicate that the area has been treated.
5. Record date treated.
6. Determine the number of acres sprayed. Then compare the actual number of gallons sprayed against the calculated number of gallons used based on acreage.

- | | |
|--|----------|
| a. Count the number of whole sections completed. | a. _____ |
| b. Determine the number of sections partially completed. | b. _____ |
| c. Determine what fraction of the partially completed sections has been treated . | c. _____ |
| d. ADD $a + (b \times c)$ = total number of sections treated. | d. _____ |
| e. MULTIPLY $d \times 640$ = total number of acres treated. | e. _____ |
| f. Estimate any significant amount of acreage skipped or avoided in the spray block. | f. _____ |
| g. SUBTRACT $e - f$ = actual number of acres treated. | g. _____ |
| h. DIVIDE $g \div (\text{number of acres 1 gallon of pesticide will treat at the target application rate})$ = calculated number of gallons used. | h. _____ |
| i. Determine the actual number of gallons used from the Daily Aircraft Record, PPQ Form 802. | i. _____ |
| j. SUBTRACT $i - h$ = difference between actual and calculated number of gallons used. | j. _____ |
| k. DIVIDE $(j \div i) \times 100$ = percent difference between calculated and actual number of gallons used. | k. _____ |

The calculated number of gallons used (h) should be close to the actual number of gallons used (i). Determine the cause of any significant difference in these numbers. A difference of plus or minus 5 percent is significant.

4

Aerial Application
Manual

Program Supervision

Pesticide Supply

Introduction

Determining the amount of pesticide to order for the project is an important step in program planning. Worksheets and information for determining the amount of pesticide to order can be found in **Pesticides** in the **Program Planning** section.

The following formulas can be used to determine if there is an adequate supply of pesticides on hand to ensure on time completion of the project.

Other important information you need to consider is the actual amount of pesticide being used as compared to the actual acres of the block that have been treated. A disparity between these two figures will indicate calibration problems or other application problems. See **Calibration of Aerial Spray Systems** in the **Program Startup** section.

Pesticide Supply Formulas

Use these formulas to determine if a pesticide shortage will occur.

Determining Number of Acres Remaining in the Treatment Block

$$\frac{\text{Number of acres in treatment block remaining to be treated} \\ \text{Number of acres (if any) of buffer zones and sensitive no spray zones}}{\text{Total acres remaining to be treated}}$$

Determining Number of Acres a Gallon of Pesticide Will Treat

$$\frac{128 \text{ fluid ounces (per gallon)}}{\text{Application rate per acre in fl. oz.}} = \text{Acres 1 gallon of pesticide will treat}$$

Determining the Number of Gallons of Pesticide Required to Complete the Project

$$\frac{\text{Number of acres remaining}}{\text{Acres 1 gallon will treat}} = \text{Number of gallons required}$$

Determining the Amount of Pesticide on Hand

The initial amount delivered
+ Subsequent amounts delivered
Total pesticide delivered

Total pesticide delivered
- Total amount used
Total amount of pesticide on hand

If the total gallons of pesticide required to finish the treatment block is less than the number of gallons on hand, the supply is adequate.

If the total gallons of pesticide required is more than the supply on hand, notify the program manager of the shortage.

Continue to monitor the rate of use and determine the reason for any significant difference or change. You must predict any shortage well before the pesticide supply is depleted. Days required for delivery of additional pesticide must be planned.

4

Aerial Application
Manual

Program Supervision

Pesticide Spills

Contents

Introduction [page-4-8-1](#)
Pesticide Spill Management [page-4-8-1](#)
Spills Checklist [page-4-8-1](#)
Spill Kit Contents [page-4-8-2](#)
PPQ Manuals for Pesticide Spills [page-4-8-3](#)

Introduction

Any spillage of pesticide should be cleaned up immediately, or if that is not possible, the affected area should be fenced off until there is no danger to people, livestock, or wildlife.

Pesticide Spill Management

Contingency plans to contain and manage pesticide spills must be in place prior to pesticide delivery. Program personnel should be briefed on emergency procedures and hazard information. Personnel must also be trained in the proper use of safety and pesticide spill equipment and protocols. This section should be coordinated with **Safety** in the **Program Startup** section, and **Pesticide Storage** in the **Program Planning** section.

Spills Checklist

This checklist contains major highlights to be considered in the event of a pesticide spill. Contingency planning will lessen the likelihood of a spill and ensure an effective and efficient response.

Emergency contacts should be assembled as part of the contingency plan for accidents or pesticide spills. Place a copy of the contingency plan and contacts in **Appendix 3** that has been reserved for this purpose.

Emergency Procedures

1. Safety and First aid. The most immediate concern is for the health and well being of persons in and around the area. Evacuate the immediate area. Obtain first aid or medical treatment for anyone exposed to the pesticide.

- A. Contact the Poison Control Center for advice.
 - B. Alert the nearest medical facility, if necessary.
2. Evaluate the spill situation; then initiate appropriate steps.
3. Report the spill to the Program Manager. The Contracting Officer's Representative (COR) or Program Manager will notify the following:
 - A. State cooperator
 - B. PPQ Regional Office
 - C. National Monitoring Coordinator
 - D. State, county, or local police if an aircraft is involved
4. Contain the spill by stopping further spillage, prevent further spread, and cover the spill.

Consult pesticide labels and Materials Data Safety Sheets (MSDS) for appropriate protective clothing and hazards.

5. Safeguard the contaminated area.
 - A. Rope or fence off the area.
 - B. Post warning signs.
 - C. Guard the site as needed.
6. Clean up and collect all contaminated materials.
7. Decontaminate affected surfaces.

Follow-up Spill Procedures

1. Dispose of contaminated material.
2. Carry out monitoring procedures as directed by the Program Manager or Pesticide Monitoring Coordinator.
3. Prepare an interim report as soon as possible for the National Monitoring Coordinator.

Spill Kit Contents

Every pesticide storage site must have an accessible spill kit to contain and clean up accidental leaks or spills.

Contingency plans and procedures for managing spills must be in place in advance of storing pesticides. The contingency plan must also include training on equipment and protocols.

This is a basic list of a spill kit which can be supplemented. Large pesticide spills must be assessed for additional equipment needs to be properly handled.

TABLE 4-8-1: Spill kit at Pesticide Storage Area:

Item	Amount
50 gallon plastic garbage can with wheels (to hold contents)	2/kits
Rain suits - unlined or disposable coveralls	2
Rubber gloves - unlined	4 pairs
Rubber boots - unlined	2 pairs
Approved respirator with approved canisters	2
Goggles/safety glasses	2 pairs
Emergency eyewash system	1/kit
Shovel - square tip	1
Shovel - spade tip	1
Bar soap	2
Lime	50 pounds
Lye (sodium hydroxide - NaOH)	50 pounds
Lime and Lye MSDS	1 each
Pesticide label and MSDS	1 each
Kitty litter	100 pounds
Liquid detergent	1 quart
Potable water	5 gallons
Scrub brushes	2
Broom/dustpan	1 each
Heavy duty plastic garbage bags	50
Plastic tarp (25 ft by 25 ft)	1

PPQ Manuals for Pesticide Spills

Guidelines for Managing Pesticide Spills M390.1402 is a manual that contains important information regarding emergencies, safety, cleanup, disposal, and MSDS sheets for lime, lye, and bleach. This manual is an excellent tool to use for developing spill contingency plans and guidelines.

Collecting Environmental Monitoring Samples M390.1403 is a manual that contains information regarding proper sample collection of various environmental components that may be affected by a spill. Refer also to **Environmental Monitoring** in the **Program Planning** section.

4

Aerial Application
Manual

Program Supervision

Information Program

Contents

Information [page-4-9-1](#)

Legislative and Public Affairs (LPA) [page-4-9-1](#)

Information

Developing an effective public relations and informational program is an important part of a successful treatment program. This section contains memorandums and information to be used for effective communication with the media and the public who may be involved with, or interested in program activities. Communicating to the public correctly about the particulars of the operation is critical to gaining public understanding and public support. When public health and/or economic interests are threatened, the Agency responsible for dealing with the crisis must inspire public trust and confidence.

Legislative and Public Affairs (LPA)

LPA's Public Affairs staff coordinates responses regularly with USDA on matters involving the national media. Reprints of information developed by the staff are a valuable resource when acting as a spokesperson to the local media or private individuals. Refer to **Appendix 6** for guidelines for responding to the news media and the general public.

The LPA contact is the following:

Stuart McDonald
Public Affairs Specialist
APHIS LPA-PI
Western Field Office
12345 W. Alameda Parkway
Lakewood, Colorado 80228

Monday, Tuesday, and Friday:
Phone: 303-969-6560
Fax: 303-969-6973

Wednesday and Thursday:
Phone: 303-784-6238
Fax: 303-784-6222

4

Aerial Application
Manual

Program Supervision

Complaints

Contents

Introduction	page-4-10-1
Common Complaints	page-4-10-1
Complaints From Individuals Participating in the Spray Program	page-4-10-1
Complaints Regarding Non-target Species	page-4-10-2
Complaints Regarding Environmental Concerns	page-4-10-2
Complaints From Non-participants Including Personal Property/Health	page-4-10-2
Complaints of a General Nature	page-4-10-2
Complaint Form	page-4-10-3
Procedure for Responding to Complaints	page-4-10-4

Introduction

Aerial spray programs often encompass large land areas, are adjacent to sensitive areas, involve urban areas, or restricted airspace. Projects of this nature sometimes lead to conflict with people directly involved with the treatment block or people that live near the area that may not be aware of program purpose or need.

COR's and Program Managers should be aware that although the program has been requested by land managers or other cooperators, not everyone in the area may support the project. In some cases, complaints which need to be addressed regarding the program may arise from various people.

Common Complaints

The following is a sample of various complaints that in many cases can be resolved by simply explaining operational procedures or guidelines. Resolutions to other complaints may be more complex and may require mitigation between the party involved and program managers or regional staff.

Complaints From Individuals Participating in the Spray Program

- ◆ I did not get sprayed and I paid my money.
- ◆ You didn't kill all the bugs.
- ◆ There appears to be strips of land which didn't get sprayed.
- ◆ I got sprayed several times.

- ◆ I paid to be sprayed and now grasshoppers are moving onto my treated range and cropland from unsprayed areas.
- ◆ The spray planes were too high when they came over my place.
- ◆ The wind was blowing when they sprayed my land.
- ◆ You quit spraying my land and there wasn't any wind and it was only 10:00 a.m.

Complaints Regarding Non-target Species

- ◆ You sprayed my cows—will it hurt them?
- ◆ You sprayed my farm pond—will it kill the fish?
- ◆ Your spray killed my bees.
- ◆ Your aircraft flew over and scared my chickens and turkeys -- they piled up in the corner and smothered.
- ◆ Your spraying killed some fish in the stream.

Complaints Regarding Environmental Concerns

- ◆ Your plane(s) sprayed over this river and lake.
- ◆ I think you should stop using chemicals and use biological control agents.
- ◆ You are killing all the beneficial insects.
- ◆ Your spraying will kill all the insects needed as food for birds.

Complaints From Non-participants Including Personal Property/Health

- ◆ I got sprayed and I shouldn't have.
- ◆ You sprayed over my house.
- ◆ Your planes flew over and sprayed our residential area.
- ◆ Your spray damaged the paint on our cars.
- ◆ Your planes flew over our place and sprayed--I know because our pet is acting sick.
- ◆ Although we aren't in the spray area, I think your spray is making us sick.

Complaints of a General Nature

- ◆ We were not informed of your spraying (resident, groups, media, police, etc.).
- ◆ I work nights and sleep during the day--your planes wake me and I don't like it.

Complaint Form

The following form was developed for use on the Boll Weevil Eradication Program.

This form is used to provide documentation of an incident or a complaint received and may serve as a guideline to develop a form that fits your specific requirements (see [Figure 4-10-1](#) for a sample).

BOLL WEEVIL ERADICATION PROGRAM	
RECORD OF INCIDENT/COMPLAINT	
DATE: <u>7-4-96</u>	COMPLAINT NUMBER: <u>001</u>
CALLER'S NAME: <u>Gloria Jones</u>	PHONE NUMBER: <u>210-285-6229</u>
ADDRESS OR LOCATION: <u>RR1, Box 8, Cottonville TX 45585</u> <u>T 28.5, R 101 E.</u>	
NATURE OF INCIDENT/COMPLAINT (INCLUDE DATE AND TIME): <u>7-4-96 11:05 AM</u> <u>Mrs. Jones called and was concerned that her</u> <u>fields were not treated as agreed to.</u>	
INITIAL PROGRAM RESPONSE (INCLUDE DATE AND TIME): <u>7-4-96 11:05 AM</u> <u>Informed Mrs. Jones that I would investigate actual</u> <u>treatment times and dates in her area and provide</u> <u>that info to her.</u>	
FOLLOW-UP ACTION (INCLUDE DATE AND TIME): <u>7-5-96 8:30 AM</u> <u>I phoned Mrs. Jones that her fields were treated</u> <u>on 7-3-96 at 7:30 AM. I mailed her a</u> <u>copy of the flight path recorder print out for</u> <u>her fields.</u>	
MAP OF AREA:	CALL RECEIVED BY: <u>Emily Ruth</u>
<u>See flight path record copy</u>	

FIGURE 4-10-1: Example of a Record of Incident/Complaint

Procedure for Responding to Complaints

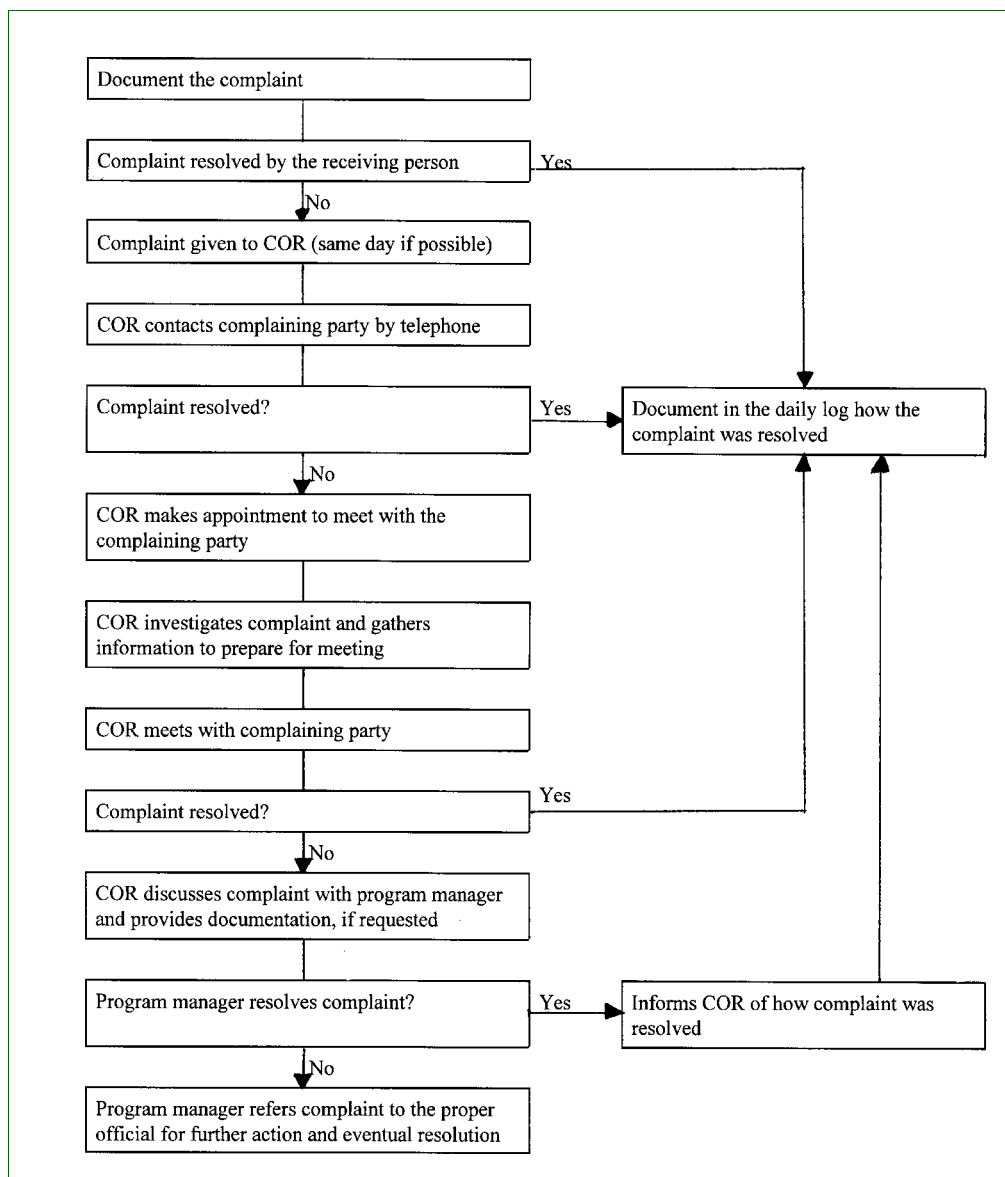


FIGURE 4-10-2: Example of a Procedure for Responding to Complaints

4

Aerial Application
Manual

Program Supervision

Program Shutdown

Contents

Introduction	page-4-11-1
Worksite Shutdown	page-4-11-1
Items to Be Addressed for Worksite Shutdown	page-4-11-1
Administrative	page-4-11-2
Daily Aircraft Record (PPQ Form 802)	page-4-11-2
Distribution of PPQ Form 802	page-4-11-2
Contract Delivery Receipt (APHIS Form 329)	page-4-11-3
Instructions for Completing APHIS Form 329	page-4-11-3
Work Achievement Report (PPQ Form 136)	page-4-11-4
Distribution of Work Achievement Report	page-4-11-5
Cooperator Billing Statements and Payments	page-4-11-5
Completing the Aerial Contractor Performance Evaluation Report (PPQ Form 817)	page-4-11-5

Introduction

Congratulations, you have reached the end of the project and you are ready to shut down field operations and complete the remaining paperwork. Shutdown generally falls into two major categories: worksite and administrative. The administrative paperwork and its distribution will vary from program to program and region to region. This section will describe the common APHIS FORMS and procedures; however, program managers will need to consult with the regional office and/or the Field Servicing Office (FSO) each season to tailor this information to your specific needs.

Worksite Shutdown

Worksite shutdown involves completion of unfinished tasks and closure of airport Shutdown operations. The following is a checklist of items to address. Each individual program will have unique circumstances that can be added to the checklist.

Items to Be Addressed for Worksite Shutdown

The following items need to be addressed for worksite shutdown:

1. Update daily, base logs, and the master program map.
2. Provide final program updates to the program manager and all cooperators.

3. Disassemble the chemical storage tanks. Triple rinse all pesticide containers and dispose of them according to prior arrangements. Rinsate should be loaded onto an application aircraft and applied in the spray block. The cost of this is sometimes charged to the program as the other gallons of pesticide applied or as a separate charge by the contractor to the program as agreed upon between the COR and contractor's representative.
4. Release the contractor. The date and time must be recorded in the program logs. Also, write a release statement on the final Daily Aircraft Record for the application, observation, guidance, or other aircraft used on the project. Obtain all necessary signatures from the contractor's representative.
5. Remove storage tank berm and liner.
6. Clean all garbage and debris from the airport worksite and other areas used.
7. Meet with the airport authorities to make sure they are satisfied with the cleanup.
8. Ensure that the contractor has met obligations with the airport authorities such as paying airport user fees and fuel bills.
9. Complete mortality assessment.
10. Remove flagging.
11. Make necessary repairs to vehicles and equipment. Resupply spill kits, safety equipment, or other supplies that were used.
12. Inventory equipment and supplies and place into storage, or deliver them to the next project.

Administrative

The next step is to satisfy program paperwork requirements, and prepare billing statements to cooperators. The following is an overview of APHIS form usage and distribution. Also refer to individual program and regional office guidelines.

Daily Aircraft Record (PPQ Form 802)

Make sure all PPQ Forms 802 are complete and signatures from the contractor's representative are obtained. Total all the information from PPQ Forms 802. This will give the total gallons of pesticide applied and the total hours of observation aircraft flight. Refer to **Daily Aircraft Record** of the **Program Supervision** section for more information on PPQ Forms 802.

Distribution of PPQ Form 802

- ◆ Part 1 (White): Attach to APHIS Form 329 and mail to FSO.

- ◆ Part 2 (Pink): Give to the contractor's representative.
- ◆ Part 3 (Green): Retain for office records.
- ◆ Part 4 (Yellow): Forward to Aircraft and Equipment Operations.

Contract Delivery Receipt (APHIS Form 329)

This form is needed by FSO to enable them to issue payment to the contractor. The program manager must complete APHIS Form 329 and submit it to FSO as soon as possible following releasing the contractor from the program. Some contractors may offer the Government a discount for a prompt or a quick payment. In other cases, the Government may be liable for penalties for a delayed payment to the contractor. See **Figure 4-11** for a sample of APHIS Form 329.

Instructions for Completing APHIS Form 329

Fill out each block using complete information.

1. **Contract No.:** Issued by FSO. It must match exactly to avoid delays.
2. **Financial Data Code:** Appropriation code issued by the regional office.
3. Name and Address of Contractor:
4. Name and Address of Consignee:
5. Item(s) Received (List ALL items received from partial delivery and complete **delivery**): Should contain a brief description and quantity of services completed by the contractor.

TABLE 4-11-1: Examples of information to record in Block 5:

Item:	Description:	Quantity:	Date:
01	Gallons of Sevin-4®Oil sprayed	7,383	7-4-95
02	Hours of Observation Aircraft	12.13	7-4-95

6. **Type of Delivery:** Check the box that indicates if the payment to the contractor is for a partial delivery or payment for complete delivery.

The Partial Delivery payment is sometimes used on projects that extend over a long period of time. A payment for partial services is sometimes made to provide operating capital to the contractor.

7. **Remarks:** Use for any other information that will be useful to the work unit, regional office, or FSO. Examples are Detailed Work Plan numbers, contract bid price for application, speed and payment rate for observation aircraft, or distribution made.

8. **Signature of Authorized Official:** The form is signed by the program manager, officer in charge, or State plant health director.
9. Typed or Printed Name and Title:
10. Date This Receipt Distributed:

TABLE 4-11-2: Distribution of APHIS Form 329

Part 1 (White):	Attach to original copy of PPQ Form 802 and mail to FSO, Accounts Payable, Claims and Payment section.
Part 2 (Canary):	Send to the contracting officer (CO) at FSO. Do not send a copy of PPQ Form 802 unless the COR or program manager has withheld a portion of the payment. Reasons could be negligent spillage, leakage, or jettisoned load. FSO will also receive a bill from the contractor. The CO will be able to resolve any discrepancy between the contractor's billing and the amount on APHIS Form 329.
Part 3 (Goldenrod):	Send to the budget section of the regional office.
Part 4 (Pink):	Retain for office records.

Work Achievement Report (PPQ Form 136)

The Work Achievement Report should be completed as per instructions in **Detailed Work Plan** in the **Program Planning** section except that you will use actual direct and associated program costs, and you will check the Work Achievement Report box. A complete itemized record for the project needs to be developed.

The financial statement for the project should include the following figures:

Direct Costs

- ◆ Pesticide
- ◆ Application
- ◆ Observation
- ◆ Other

Associated Costs

- ◆ Salaries
- ◆ Per diem
- ◆ Mileage and vehicle costs

- ◆ Communications
- ◆ Supplies
- ◆ Tank rental
- ◆ Miscellaneous

Total costs divided by the number of acres treated equal the cost per acre of the project. Distribute cost among cooperators as agreed to in the cooperative agreement, memorandum of understanding, or program guidelines.

Distribution of Work Achievement Report

Send the report, the financial statement, copy of program map, and a copy of the cooperator billing letters to the regional office.

Cooperator Billing Statements and Payments

Bill appropriate parties by a copy of the itemized record, along with a cover letter.

Payments received from cooperators should be processed by completing APHIS Form 94 (Record of Public Funds Received). Program managers should send payments and the completed form to the regional office.

Completing the Aerial Contractor Performance Evaluation Report (PPQ Form 817)

Instructions to complete this form are found in **Contractor Actions** in the **Program Supervision** section. Copies should be distributed as indicated in the lower right hand corner of the form.

PRESS HARD-You are making 4 copies			
CONTRACT DELIVERY RECEIPT			USDA-APHIS
COPY DISTRIBUTION White - Financial Services, FSO, Minneapolis Canary - Contracting Officer, FSO, Minneapolis OR Procurement and Engineering Branch, ASD, Hyattsville Pink - Retain for your Record Goldenrod - (NEC items only) - Property Services, FSO, Minneapolis		1. CONTRACT NO. 53-9384-3-74 2. FINANCIAL DATA CODE 67184-62355	
3. NAME AND ADDRESS OF CONTRACTOR Tim & Billy's Air Flight P. O. Box 2082 Mission, TX 78572		4. NAME AND ADDRESS OF CONSIGNEE Loren K. Winks, SPHD P. O. Box 2157 Bismarck, ND 58502-2157 5. PHONE NO. 701-250-4473	
5. ITEM(S) RECEIVED (List ALL items received from partial delivery and complete delivery)			
ITEM NO.	DESCRIPTION OF SUPPLY OR SERVICE RECEIVED	QUANTITY RECEIVED	DATE RECEIVED
01	Gallons of Sevin-4-oil sprayed at 16.0 fluid ounce per acre	7,383	7-11-96
02	Hours of Observation Aircraft	12.13	7-11-96
6. TYPE OF DELIVERY → <input type="checkbox"/> PARTIAL DELIVERY <input checked="" type="checkbox"/> COMPLETE DELIVERY			
7. REMARKS <div style="margin-left: 40px;"> $\\$6.55/\text{gallon} \times 7,383 = \\$48,358.65$ $\\$140.00/\text{hour} \times 12.13 = \\$1,698.20$ Total \$50,056.85 DWP # ND 1 (Sand Creek Spray Block) </div>			
<small>I certify that the articles, and/or services indicated above have been received, inspected and accepted as complying with the contract terms and conditions (except as noted under "Remarks") as of the date shown below.</small>			
8. SIGNATURE OF AUTHORIZED OFFICIAL 		9. TYPED OR PRINTED NAME AND TITLE Loren K. Winks State Plant Health Director	
APHIS FORM 329 <small>(AUG 82) previous editions obsolete.</small>		10. DATE THIS RECEIPT DISTRIBUTED 7-12-96 <small>GPO #92-304</small>	

FIGURE 4-11-1: Example of a Contract Delivery Receipt (APHIS Form 329)



Appendix A

Worksheet for Determining the Number of Aircraft Needed for a Program

The worksheet on the following page is useful for determining the number of aircraft you will require to complete a project based on the size of the treatment block and the number of days you have to complete it.

Worksheet FOR DETERMINING THE NUMBER OF AIRCRAFT NEEDED FOR A PROGRAM

STEP 1. Determine the total number of operational application hours to complete the program:

Enter in cell "A" the time you can begin application based on the weather and light (the estimated time that conditions become favorable for application)	A= (military time)
Enter in cell "B" the time you must quit spraying based on when droplets begin to hang or drift off (the estimated time that conditions become <i>unfavorable</i> for application)	B= (military time)
Subtract "A" from "B" to determine "C" (the number of application hours available in a day) $B - A = C$. Enter in cell "C"	C=
Enter in cell "D" the number of days available to complete the program	D=
Multiply "C" times "D" to determine "E" (the total number of operational application hours) $C \times D = E$. Enter in cell "E"	E=

STEP 2. Enter in "F" the total number of acres you need to cover

F= _____

STEP 3. Enter in "G" The average number of acres covered per hour based on the aircraft to be used.
(Determine the average number of acres the aircraft can treat in an hour¹ from the table in [Table 2-7-2](#), [Table 2-7-3](#), [Table 2-7-4](#), [Table 2-7-5](#)

Enter the name of the aircraft: _____

G= _____

STEP 4. Divide "F" (the total number of acres you need to cover) by "G" (the average number of acres covered per hour based on the aircraft to be used) to determine "H" (the total time required for one aircraft to cover the designated area) $F/G=H$
Enter in "H"

H= _____

STEP 5. Divide "H" (the total time required for one aircraft to cover the designated area) by "E" (the total number of operational application hours) to determine "I" (the average number of aircraft needed to complete the program) $H/E=I$
Enter in "I"

I= _____

STEP 6. Round up "I" to the largest whole number to determine the number of aircraft needed.
Enter whole number here:

(No. of aircraft needed)

¹ This figure compensates for ferrying and turn-arounds



Appendix B

Chapter 7, Section 6, Cholinesterase Testing Program

This appendix contains a reprint of Chapter 7, Section 6, of the [APHIS Safety and Health Manual](#) which covers the cholinesterase testing program.

CHAPTER 7

SECTION 6 PSITTACOSIS TESTING PROGRAM

7.6.1 PURPOSE

The psittacosis health monitoring program is mandatory and provides educational information for the employee as well as a program that will assist in the prevention of contracting the disease.

7.6.2 GENERAL

Psittacosis is a chlamydiae disease that may be contracted by APHIS employees having direct contact with various avian species. Bird species which are known to harbor the chlamydial organism, the causative agent of psittacosis, are numerous. The more common species involved are birds of the psittacine family (parrots, parakeets, cockatoos, etc.), pigeons, and turkeys. Employees should also be aware that other animals, such as sheep and goats, are reported to carry the disease.

Psittacosis in humans varies considerably. Its incubation period is usually between 1 and 2 weeks, but may be longer. Symptoms may include fever, headache, and some involvement of the lungs. Initially, a cough may be absent; however, a cough usually develops as the disease progresses. Other clinical manifestations of the disease may be a lack of appetite, rash, diarrhea, vomiting, hepatitis, and fatigue. In rare cases, pregnant women exposed to *Chlamydia psittaci* can contract gestational psittacosis: atypical pneumonia, sepsis, and placental insufficiency resulting in premature birth or miscarriage. In the United States, prior to 1996 only two cases of gestational psittacosis were reported, both from exposure to psittacine birds. Eleven other cases were

reported worldwide, mostly in the United Kingdom, all from exposure to infected birth fluids and membranes of farm mammals, notably sheep and goats. In these mammals, *C. psittaci* can inhabit the reproductive tract.

Persons most likely to contract psittacosis are those exposed to birds at bird quarantine facilities, border crossings, and import centers. The primary means of transmission is by inhalation. Infected birds excrete the chlamydial organism in their feces, and it is extremely viable in the dried state. Exposure to a contaminated environment, or even to the aerosol created by the beating of a caged bird's wings, is sufficient to produce infection. Psittacosis should be suspected when an ill employee has had recent contact with a sick or dead bird, although an apparently healthy bird can carry and shed chlamydiae. Person-to-person transmission of psittacosis is infrequent.

The Centers for Disease Control strongly recommends that pregnant women avoid contact with birth fluids or membranes of sheep and goats and close contact with psittacine birds during pregnancy.

7.6.3 RESPONSIBILITY

The responsibility for establishing and maintaining the psittacosis program in the field will be with the Occupational Medical Monitoring Program Coordinator (OMMPC) as delegated by the senior line manager and referenced in Sections 7.2.3 and 7.2.6.

7.6.4 HEALTH MONITORING PROGRAM

Diagnosis of psittacosis in humans can be made by serologic tests. A serological monitoring program will be established for employees having routine contact (once a week or more often) with birds or poultry. A predisposes blood sample will be taken as soon as possible from each employee to establish a serological baseline.

Blood tests will be performed every 6 months after the initial sampling and as long as the exposure exists.

Those employees having less than routine contact may volunteer for a serological monitoring program with the approval of their supervisor.

If an employee with less than routine contact decides not to participate in the health monitoring program for psittacosis, they still must be familiar with and abide by the other parts of this Section.

APHIS Form 29, Supervisor's Request for Health Monitoring, will be used in conjunction with all blood testing as outlined in Section 3.

If possible, employees should use U.S. Military, U.S. Public Health Service, Veterans' Affairs, and other Federal, county, or municipal health units to have serum samples collected and tested. Employees may use private physicians if such health units do not exist. The Marshfield Clinic is also available for testing the serum samples. See Section 7.3 for specific instructions for submitting samples to Marshfield.

Any employee who develops clinical signs of psittacosis and who has a history of exposure to birds or poultry will immediately notify his/her supervisor who will authorize a serological test for psittacosis, utilizing APHIS Form 29.

The OMMPC will ensure that blood test results and interpretation of those results are available when testing is performed at locations other than Marshfield.

7.6.5 PERSONAL PROTECTIVE EQUIPMENT

APHIS employees who are at risk must wear protective respirators covering the mouth and nose. A respirator with at least an N95 rating must be worn. Surgical masks may not be effective in preventing transmission. Goggles, antiseptic soaps, disinfecting solutions, and surgical gloves may also be necessary.

7.6.6 OTHER PRECAUTIONS

The following are precautions which will further assist in preventing the contraction of psittacosis:

Dust should be controlled by proper ventilation and cleaning of areas where dust collects, since the primary means of transmission to humans is by inhalation.

Because *C. psittaci* has a high lipid content, it is susceptible to most disinfectants and detergents. A 1:1,000 dilution of quaternary ammonium compounds (alkyldimethylbenzyl ammonium chloride [e.g., Roccal ® or Zephiran ®]) is effective, as is 70% isopropyl alcohol, 1% Lysol ®, 1:100 dilution of household bleach (i.e., 2.5 tablespoons per gallon [10 mL/L]), or chlorophenols. *C. psittaci* is susceptible to heat but is resistant to acid and alkali. Many disinfectants are respiratory irritants and should be used in a well-ventilated area. Avoid mixing disinfectants with any other product.

Waste from birds will not be allowed to accumulate. Wetting of the waste material with a disinfecting solution is helpful in reducing dust and destroying the chlamydial organism.

Protective gloves will be worn whenever birds are handled.

Birds will be necropsied in a biological safety hood which is equipped with a high efficiency particulate filter, or other system, to prevent the emission of infectious agents.

The feathers of birds to be necropsied must be moistened with water and detergent rather than a disinfectant. Disinfectants should not be used in the water since the residual effect of the disinfectant may destroy the purpose for the necropsy.

Individuals working with birds may be exposed to other microorganisms associated with birds, which are infectious for humans. Newcastle disease virus in humans is a good example. It may cause conjunctivitis and upper respiratory infection. Therefore, protection of the eyes should reduce the chance of contracting infection. Wearing protective goggles securely placed over the cheeks, forehead, temple, and bridge of the nose, in addition to the respirator, is recommended.

When possible, DO NOT keep birds in the office. When isolettes or filtered containers are not available, cover the bird cages with a dark cloth to keep the bird quiet. (NOTE: The cloth cover could contain the infectious airborne agents.)

Prior to working with birds or poultry in quarantine or on private premises each employee will be given information by the supervisor concerning psittacosis. This information will include symptoms, protective equipment, contact persons, etc.

7.6.7 MONITORING, REVIEWING, AND RECORDKEEPING RESPONSIBILITIES

7.6.7.1 Responsibilities of the Marshfield Clinic.

Analyze and interpret laboratory results of all samples received, as authorized by and with the consulting services of the USDA Medical Officer.

Make distribution of APHIS Form 29 as indicated in Section 3.

Notify by telephone the OMMPC or SHES if sample results reflect a titer indicative of infection.

7.6.7.2 Responsibilities of Supervisors.

Initiate all routine requests for psittacosis serological testing using APHIS Form 29 as directed by the appropriate OMMPC.

Ensure that all protective devices are available and that safety and health precautions are adhered to by employees.

Periodically contact each employee (new and current) and reinforce the ramifications of contracting psittacosis.

Be especially alert for the symptoms of psittacosis in themselves and their employees.

Authorize the use of APHIS Form 29, so that the employee may be examined by a physician at APHIS expense, if psittacosis is suspected, or clinical symptoms develop.

7.6.7.3 Responsibilities of the OMMPC.

Ensure that all employees who are exposed, or have the potential of being exposed to *C. psittaci*-infected animals, take preexposure and periodic blood tests as required.

Keep a record of psittacosis tests for all their employees. This record

will be compiled based upon information taken from Part 5 of APHIS Form 29 and will include names of employees, dates of tests, and test results. It is recommended that a graph record of all tests be made for each employee. Records will be maintained for a period of 5 years.

Conduct an investigation to determine the reasons for the contraction of psittacosis by any employee. Results of the investigations and actions taken should remain on file and be available for APHIS safety and health reviews.

Has the ultimate responsibility to see that proper types and amounts of safety and health materials are on hand to adequately perform the job functions without contracting psittacosis, whenever there may be exposure to birds and poultry.



Appendix C

Pesticide Spill and Accident Contingency Plan and Emergency Contacts

Introduction

This appendix is reserved for the pesticide spill and accident contingency plans and emergency contacts that are developed by each work unit for local, site specific, or program specific needs and circumstances.

Contingency Plan

Develop an information sheet that can be distributed to COR's or other personnel as they arrive on site. The contingency plan should contain names, phone numbers, fax numbers, and addresses. Information will vary from State to State. The following contacts should be included in the plan. Other contacts should be included as local conditions dictate.

- ◆ State plan health director (include home phone)
- ◆ State pesticide enforcement official
- ◆ Appropriate Tribal agency
- ◆ Regional office of the Environmental Protection Agency (EPA)
- ◆ Riverdale DEO
- ◆ CHEMTREC (use if spill occurred during transportation)
- ◆ Local poison control center
- ◆ Local fire department
- ◆ Local hospital
- ◆ Local ambulance
- ◆ Local police department
- ◆ Pesticide monitoring lab



Appendix D

Ground Equipment

This appendix is reserved for technical drawings of ground bait and ground liquid application equipment.



Appendix F

Guidelines for Responding to the News Media

This appendix is a Plant Protection and Quarantine publication which contains guidelines for responding to the news media.



PLANT PROTECTION AND QUARANTINE



United States
Department of
Agriculture

Animal and Plant
Health Inspection
Service

P.O. Box 96464
Washington, DC
20090-6464

June 1, 1994

SUBJECT: APHIS Guidelines for Responding to the News Media

TO: All APHIS EMPLOYEES

This is a reminder that all national media calls should be forwarded to Legislative and Public Affairs (LPA). LPA's Public Affairs staff coordinates responses regularly with the Department on matters involving the national media. LPA needs your cooperation in order to ensure that employees of USDA speak with one voice.

The term "national news media" includes newspapers such as USA Today, The Wall Street Journal, The New York Times, The Los Angeles Times, and any Washington metropolitan area paper; general news magazines, such as Newsweek, Time, and the National Geographic; all network affiliate television and radio stations such as NBC, CBS, ABC, Fox, and CNN; and all news services such as AP, UPI, and Reuters.

If you are contacted by a reporter, be friendly but explain that you will have the appropriate spokesperson return the call. Make sure you make note of the reporter's name, telephone number, and affiliation before alerting your supervisor and contacting LPA. Review the enclosed "Guidelines for Responding to the News Media" for an overview on the procedures and the "General Tips for Positive Communication" if you become the designated spokesperson.

Local media issues can also have national scope so seek LPA guidance if you're uncomfortable with the nature of the call. You can reach a public affairs specialist at (301) 436-7799.

Your cooperation is appreciated.

Lonnie J. King
Acting Administrator

Enclosure



APHIS - Protecting American Agriculture

An Equal Opportunity Employer



Guidelines for Responding to the News Media

APHIS has an open-door information policy. APHIS employees are authorized and encouraged to discuss their work with the mass communications media, in schools, and before organizations and community groups. Discussions and talks should be within the scope of employees' work and competence. Information provided should be based on fact and not rumor or speculation about rumors.

Always keep supervisors fully informed of your efforts in these areas so they can pass the information up the line.

Clearance Procedures for Responding to the Media

Clearance procedures apply to only three categories of requests—those from national media, those from regional or trade media, and those from the local media.

National media or sensitive issues requests: All requests from national news media are coordinated through Legislative and Public Affairs (LPA) for consultation with the Secretary of Agriculture's director of communications and press secretary. This review (1) identifies sensitive issues or those that could have national interest, and (2) allows LPA an opportunity to help identify the best spokesperson available on a particular topic or issue. If the request is merely for factual information in an area for which you are responsible, supply the information and then inform your supervisor of your actions. National media include the major TV networks, CNN, and major metropolitan newspapers, such as The L.A. Times and The Chicago Tribune and the major wire services, such as Associated Press and United Press International.

Regional or trade media requests: Unless the issues are of special sensitivity or deal with matters that could attract national attention, requests from regional or trade media can be handled at the local level without any special clearance. However, since trade media usually have a national distribution and regional stories have the potential for receiving wider attention, LPA should be notified the same day the request is received so they have an opportunity to alert the Department before the article is published or broadcast is made. Regional media include requests from public broadcasting stations.

Local media requests: Unless the issues are of special sensitivity or deal with matters that could attract national attention, requests from local media can be dealt with at the local level without any special clearance. Local media include affiliates of national networks or representatives of wire services.

Responsibilities

Employee—Information is everyone's job. APHIS employees have a responsibility to tell their part of the story of how APHIS helps protect American agriculture. If news accounts of issues affecting APHIS appear in the local press, employees should provide the information to their supervisor.

Supervisor—Supervisors should include information concerning local, regional, and national media contacts in their weekly reports. Clippings should be faxed to LPA at 301/436-5221. LPA should be notified immediately of any requests from national media; the same day of regional or trade media contacts; and in weekly reports for local media activity.

LPA—LPA has specific responsibilities for: (1) communicating with representatives of the media about APHIS programs; (2) directing and organizing the communications effort of APHIS in cooperation with program officials; and (3) producing information tools—such as pamphlets, videos or newsletters—for use by APHIS employees.

LPA has Public Affairs Specialists who support each program area. These specialists, who have been trained in dealing with reporters, are familiar with the programs and are available to provide assistance to headquarters and field offices in responding to the media. Assistance is available in such areas as media guidance; evaluation of media requests; and review or development of fact sheets, press releases, publications, videos, and exhibits. Please contact Public Affairs (PA) within LPA at 301/436-7799 for additional information.

Referring non-media calls to LPA—Callers requesting specific releasable information or expressing opinions about APHIS programs or procedures should not be referred to LPA-PA or the Freedom of Information Act (FOIA) office. Calls from the general public requesting a copy of brochures or other documents can be referred to LPA-PA. Industry representatives, lawyers, regulated entities, agriculture producers, etc., should be provided releasable information rather than being referred to LPA-PA or FOIA. (A general rule of thumb: If the caller had written instead of called, and you would have had to answer the letter, then you should also answer the telephone request)

When to direct callers to make a written FOIA request—If a caller specifically requests copies of agency records that were not created for public use or that are not already in the public domain, then the caller should submit a written request for copies of those documents to the FOIA office. Fact sheets, brochures, pamphlets, Federal Register articles, regulations, agency directives, etc., are examples of records that were either created for public use or are already in the public domain.

Calls for general information about agency programs and activities are not FOIA requests. If you are not sure if the information the caller is seeking qualifies as a FOIA request, call the FOIA office at 301/436-5008 before referring the requester.

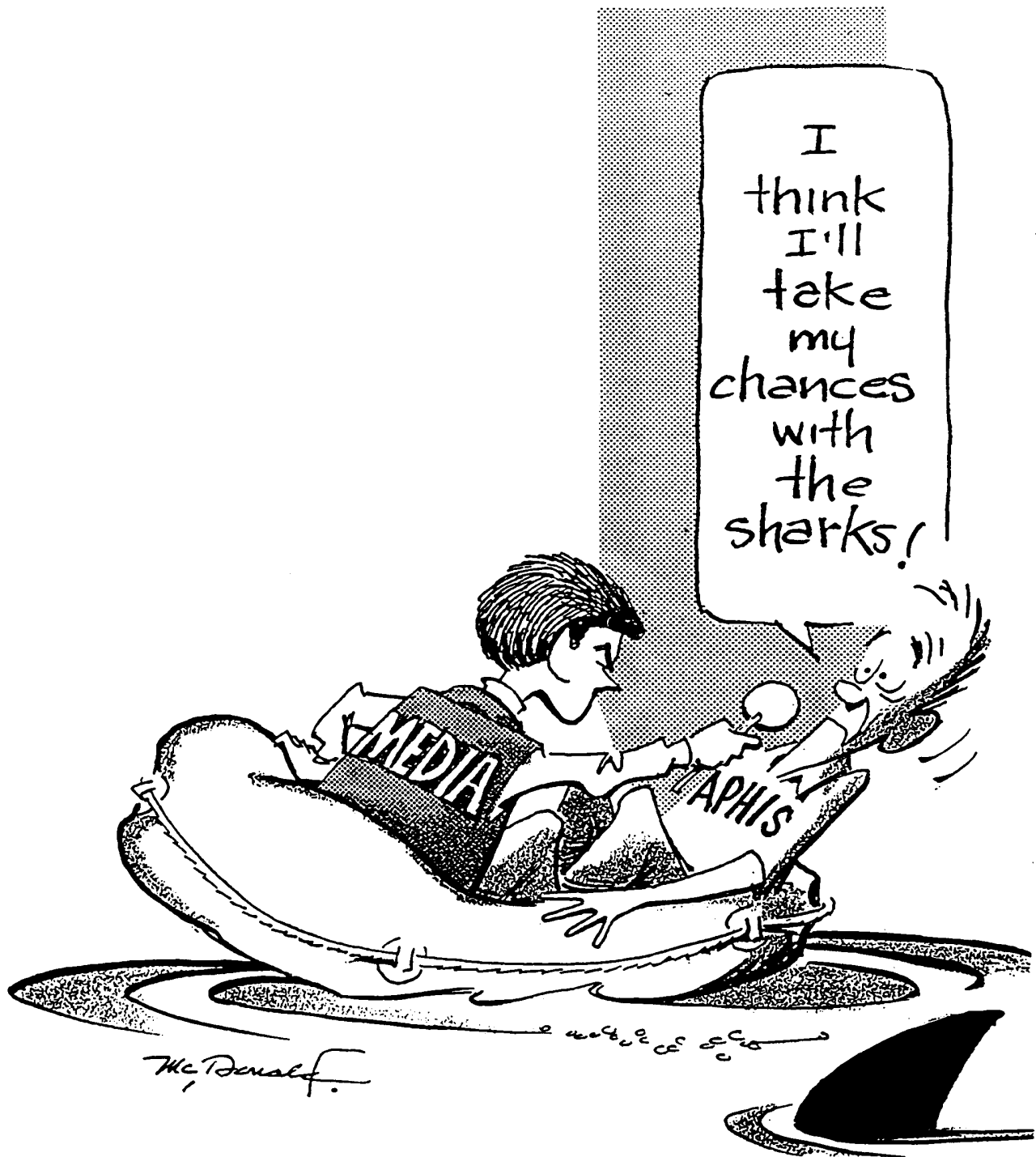
Providing Information about Media Requests

The steps outlined below should be followed when a request is received from the media:

- ◆ Ask for the name, affiliation, and phone number of the individual.
- ◆ Determine the topic for the interview or visit
- ◆ Find out when the media representative needs the information.
- ◆ Respond to the request according to the clearance guidelines outlined earlier.
- ◆ Tell interviewers that someone will get back to them after the most appropriate and knowledgeable spokesperson for the agency is identified.
- ◆ Notify your supervisor.

MEDIA REFERRAL GUIDE

Types of Questions	Where to refer them
Fall outside of your jurisdiction	The appropriate agency Provide name and number
Fall outside of your expertise.	Supervisor Provide name and number
Involve agency policy	Director, deputy, or administrator Arrange return call
Involve a controversial/sensitive issue	Designated spokesperson or LPA-PI (301) 436-7799
Deal with budget or finance	Mike Gregoire Budget and Accounting Div (301) 436-8014
Deal with broad questions or require too much time	LPA-PI





General Tips for Positive Communication

The following are some tips on dealing with reporters, community leaders, or members of organizations so you can help them inform the public about APHIS activities and programs:

- ◆ Know who you are talking with. Identify yourself and obtain the identity of your interviewer. Remember, as an employee of APHIS, you represent the agency and USDA. There is no such thing as a private opinion or an off-the-record comment about APHIS programs or actions.
- ◆ Be courteous and polite. Approach every request for information as an opportunity to tell the APHIS story. The public has a right to know how our programs operate. If you are not the proper person to release information, tell the requester you need time to gather information in order to answer questions accurately. Then, help find a person who can answer the questions. If the requester is a reporter, you can refer them to the Public Affairs (PA) office, Legislative and Public Affairs (LPA).
- ◆ Stay within your field of work. You are qualified to speak about your job and what you do. If you are asked about subjects outside your area of responsibility, simply tell the requester that it would not be appropriate for you to provide information on the subject. At the same time, be responsive. If it is not appropriate to respond, offer to refer the requester to your supervisor, LPA, or the proper source of information.
- ◆ Do not debate. If asked to comment on rumors, “what if” situations, policy, or charges against the agency or another organization, ask for the facts and offer to report back after you have had a chance to obtain information related to the questions. Keep in mind, you do not need to have an answer for every question and that every question is not necessarily appropriate or requires an answer. If you do not know the answer, say so in a diplomatic manner.
- ◆ Do not justify agency programs. Most of the programs of APHIS exist as a result of public demand and legislative action. Concentrate on providing information about what we do and how we do it. The justification for our programs resides in legislation and policy decisions. Remember, we are not the spokespersons for the industries of agriculture. Questions related to how our programs benefit agricultural industries, beyond eliminating threats to the industry, should be referred to the particular industry representatives for an answer.

- ◆ Offer additional information to clarify a story. Too often, specific questions are answered as briefly as possible without offering background facts to complete the story. This can result in inaccuracies. On the other hand, don't offer unnecessary information. Do not volunteer something that will raise more questions than it answers. Stay focused on the subject at hand.
- ◆ Avoid jargon and technical terms. Do not say “morbid” say “sick” do not say “equine” say “horse” or “pony,” do not say “bovine” say “cow” or “cattle.” Also avoid red-flag words that result in an emotional reaction; there is usually a more neutral word that can be substituted such as predator vs. coyote, unlicensed or illegal dealers vs. puppy mill, inspection procedures vs. passenger profiles, euthanasia vs. kill or depopulate, fined vs. assessed a civil penalty.
- ◆ Be aware of deadlines. All reporters have deadlines. Ask what the deadline is so you can supply the needed information in time. However, your answers must be accurate, so if you cannot verify your information before a deadline, do not speculate or guess.
- ◆ Use precleared information pieces. Press releases, brochures, fact sheets, videos, and other APHIS information pieces are designed to explain APHIS programs. These should be referred to when responding to requests for information.
- ◆ Keep headquarters informed. Once you have provided assistance to media representatives, inform your supervisor immediately. This can help if your supervisor is contacted by the same reporter. Requests for interviews from major news media (such as network TV or major magazines or newspapers) and on subjects of special sensitivity should be referred to LPA before assistance (other than general factual information) is supplied to the reporter. All contacts by the media to headquarters offices should be referred to LPA.

TIPS FOR HANDLING THE MEDIA

1. **WHAT IS THE FOCUS OF THE ARTICLE?** Is the news story about what kind of work the Animal Plant and Health Inspection's Animal Damage Control program does, or is it about how ADC kills wildlife. One is a potentially hazardous subject. Request a list of the reporter's questions before the interview. Rehearse answers with LPA-PI.
2. **BACKGROUND ON THE REPORTER.** Take charge of the interview from the beginning by asking for samples of the reporter's clips. Find out if the reporter has a tendency to sensationalize news.
3. **CLEAR THE INTERVIEW.** Consult with your supervisor and LPA-PI before accepting any media opportunities.

4. **THE FINISHED PRODUCT.** Before agreeing to the interview ask to see the completed article. If this request is denied, ask to review quotes attributed to you.
5. **PART OF THE TEAM.** Always direct questions away from yourself. Sell Veterinary Services and APHIS.
6. **AVOID MAKING OFF-THE-RECORD STATEMENTS.** Unless ground rules are established before the interview, anything you said is on the record.
7. **COVER YOURSELF.** If feasible, ask a public affairs specialist to go with you. If conducting a phone interview, put it on the speaker-phone for another party to hear. If possible, tape-record the interview and have someone take notes.
8. **DEADLINES.** Be considerate of media deadlines, but don't let a reporter pressure you into talking about a topic you are not prepared to discuss. Return calls promptly, or refer them to LPA-PI.
9. **SELL USDA.** No matter what question is asked, you are in control of the answer. Work with LPA-PI to develop concise, interesting facts about your job and APHIS

Offer additional information to clarify a story. Too often, specific questions are answered as briefly as possible without offering background facts to complete the story. This can result in inaccuracies. On the other hand, don't offer unnecessary information. Do not volunteer something that will raise more questions than it answers. Stay focused on the subject at hand.

Avoid jargon and technical terms. Do not say “*morbid*” say “*sick*” do not say “*equine*” say “*horse*” or “*pony*” do not say “*bovine*” say “*cow*” or “*cattle*.” Also avoid red-flag words that result in an emotional reaction; there is usually a more neutral word that can be substituted such as *predator* vs. *coyote*, *unlicensed* or *illegal dealers* vs. *puppy mill*, *inspection procedures* vs. *passenger profiles*, *euthanasia* vs. *kill* or *depopulate*, *fined* vs. *assessed a civil penalty*.

Be aware of deadlines. All reporters have deadlines. Ask what the deadline is so you can supply the needed information in time. However, your answers must be accurate, so if you cannot verify your information before a deadline, do not speculate or guess.

Use precleared information pieces. Press releases, brochures, fact sheets, videos, and other APHIS information pieces are designed to explain APHIS programs. These should be referred to when responding to requests for information.

Keep headquarters informed. Once you have provided assistance to media representatives, inform your supervisor immediately. This can help if your supervisor is contacted by the same reporter. Requests for interviews from major news media (such as network TV or major magazines or newspapers) and on subjects of special sensitivity should be referred to LPA before assistance (other than general factual information) is supplied to the reporter. All contacts by the media to headquarters offices should be referred to LPA.

Guidelines For Crisis Communications

KNOW THE MEDIA. Don't wait for a crisis to become familiar with your local media representatives.

PROVIDE BACKGROUND INFORMATION. Compile a packet of proactive information about APHIS and your program area.

DON'T HIDE THE FACTS. Tell your side first. Fight the instinct to sweep embarrassing news under the rug.

PICK ONE SPOKESPERSON. Find the most qualified person to speak for the issue.

Interview Response Guide

Prepare	Develop and refine your answers in advance Practice
Focus	Clear your mind of distractions Concentrate on the interview at hand Take a deep breath and relax
Think	<ul style="list-style-type: none">◆ Keep it simple◆ Speak conversationally and confidently◆ Select and emphasize 1-2 key points◆ Give direct answers
Attention	<ul style="list-style-type: none">◆ Listen carefully to questions◆ Don't get ahead of the question◆ Pause before you speak◆ Clarify
Wrap-up	<ul style="list-style-type: none">◆ Use an anecdote, explanation, illustration◆ Make points not covered in the interview◆ Stop when the interview is over

The Interview

Knowledge Is Power: It is unlikely that you will ever come face-to-face with an overly aggressive reporter. But if you do, relax and remember that you know more about APHIS and your job than the reporter. That is why you are being interviewed.

Before

- ◆ Inform your supervisor and LPA-PI
- ◆ Respond to request quickly
- ◆ Ask reporter for a list of questions
- ◆ Find out story angle/other sources
- ◆ Do your homework/prepare for tough questions
- ◆ Develop 1-2 talking points
- ◆ Rehearse answers/role-play
- ◆ Plan your wardrobe
- ◆ Set the stage
- ◆ Set ground rules
- ◆ Provide background information

During

DO'S

- ◆ If you don't know the answer, say so
- ◆ Stay calm
- ◆ Maintain eye contact
- ◆ Be natural, confident
- ◆ Be cooperative/professional
- ◆ Be positive; try to have fun
- ◆ Avoid jargon
- ◆ Keep answers short, punchy
- ◆ Be prepared for the unexpected
- ◆ Pause before you speak
- ◆ Stick to your area of expertise

DONT'S

- ◆ Refuse to be interviewed
- ◆ Rock, swivel, pace, twitch
- ◆ Make faces into the camera
- ◆ AHH, UHH, UMM, UGH...

- ◆ Try to snow the reporter/lie
- ◆ Try to be something you are not
- ◆ Use jargon and lingo
- ◆ Talk yourself into a hole/ramble
- ◆ Use too many words
- ◆ Offer “no comment”
- ◆ Get excited/upset/walk away
- ◆ Go off the record
- ◆ Offer personal opinions
- ◆ Predict the future/talk policy
- ◆ Buddy-up to reporter
- ◆ Take questions personally/be defensive
- ◆ Stray from the agreed topic of discussion
- ◆ Introduce a new story angle

After

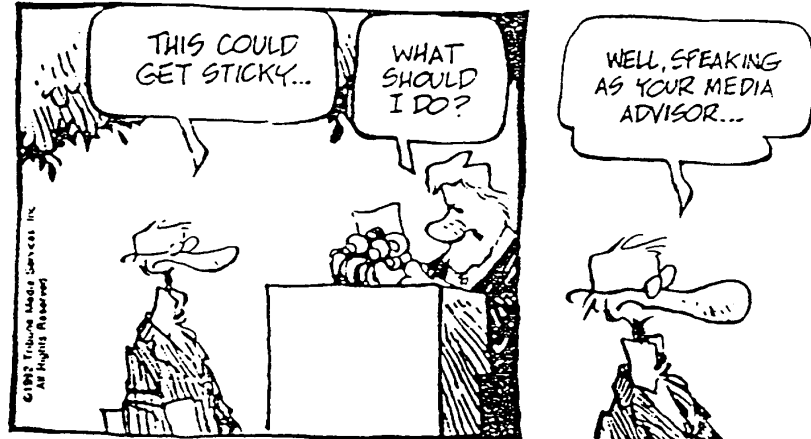
- ◆ Make sure interview is over—but still stay on-the record
- ◆ Brief your supervisor and LPA-PI
- ◆ Follow up with reporter
- ◆ Obtain air/print date
- ◆ Ask for copy of finished product
- ◆ Correct mistakes with LPA-PI guidance
- ◆ Provide LPA-PI with clippings/tapes
- ◆ Ask someone you trust to critique your performance
- ◆ Ask yourself what you would do differently
- ◆ Select areas for improvement, then work on them

10 Tips for Conducting Phone Interviews

1. Get rid of nearby distractions
2. Take no other calls during interview
3. Ask for time to prepare, if needed
4. Consider making a cassette recording of your half of the conversation/have someone take notes
5. Make sure you ask what areas are to be covered
6. Ask who else has/will be interviewed

7. Ask reporter if the call is being recorded
8. Review the key points you have made before you hang up
9. Ask if reporter needs clarification on any point
10. Ask when interview will be printed or broadcast

SHOE



Jeff MacNelly



Appendix E

Typical Aerial Application Treatment Project

Introduction

The following story, written by L. Keith Winks, PPQ, Bismarck, ND, is based on the actual daily and base logs of a grasshopper treatment program that was conducted in the badlands of western North Dakota. The purpose of the story is to give the reader a general overview of some of the logistical hurdles and topics from this manual that Program Manager's and Contracting Officer's Representative (COR's) must deal with then conducting aerial treatments. This is just one story of one project, but hopefully it will give users of this manual the flavor of an actual aerial treatment project. Every pest program and project is unique and the story is mild compared to many other stories that have been told by others. Still, all the stories told have a common basic theme--that is, conducting aerial treatment programs is difficult and often controversial, but the programs also are challenging and interesting.

Program Story

You say we have a grasshopper meeting in February? How come we are talking about grasshoppers when it is 5 below zero outside? Well, it's an open meeting for all folks to air their opinions. All interested and concerned people are notified usually by a county agent, grazing association or representative responsible for the meeting. If a meeting is not held for the general public, then we, PPQ, cannot do a program. This proposed meeting must be advertised in the local media, newspaper, radio, etc. Also at this meeting, ranchers may show intent to treat and give us a headstart for planning.

What? I have to notify beekeepers?

Yes, all beekeepers must be notified in all areas where control is anticipated.

Environmental assessment (EA)? --- Yikes. Make sure the Finding of No Significant Impact (FONSI) and the Record of Decision (ROD) are completed. We can't treat until they are signed and in place. We need to send the EA to all the different groups for comment? Boy we better get cracking.

Let's see, are we or aren't we going to have a control program. Do we have enough people, vehicles, radios, GPS units, flagging, spill kits, safety material for training, wind meters, dye cards etc., etc. I can't remember if the oil sensitive type work for carbaryl or malathion.

Oh no! The scouts have found grasshoppers and more grasshoppers! Well, I guess I had better contact the interested parties and give them an update. Let's see, we have Forest Service, Bureau of Land Management (BLM), State and private land in the area. Whoa --- I have to contact all of these people! The ranchers and land managers want control? I had better have another meeting with all interested parties and discuss everything. Let's see --- do I have the State Cooperative Agreement in place?

Is the State going to cost share? Oh ya, I will need a request letter from each of the Federal land managing agencies. Let's see, I'd better have the rancher committee sign the rancher agreement and then send it to the Region. Hey you ranchers --- you need an account at a bank for your share of the cost. The money must be in this account before I can call in the contractor bids.

What does that Hopper software program say? Is it worth it to treat? Whoa --- I'd better make up the Detailed Work Plan and send it to the Region.

How big is this area? We need to delimit it. Do the hoppers extend into all the proposed area? If not, trim the block, If hoppers extend outside the area, notify the rancher committee. Remember, if we don't treat the entire infestation, there is a good chance the area will reinfest.

Oh my gosh! Have I notified the local State and Federal fish and wildlife agencies? I had better meet with them, and see if they have any concerns.

Boy, everything is falling into place. Now what? You know I'd better be getting the contract in place. What do I do first? Well, I'd better read the prospectus and see what my duties as the Contracting Officer's Representative will be.

Well, I guess it is time to fill out the contracting bid description sheet. Man --- this is important. The whole project revolves around this. How many planes? What types? I hope the electronic guidance works. This must go to the Region ASAP. It takes about 10 days to 2 weeks before the planes come in and the project starts. The description data sheet must be sent through the region to FSO in Minneapolis. I'd better order the insecticide. How much do I need? Be careful, we don't want to be cut short and I don't want to end up with a surplus.

Aircraft Operations --- can you get a pilot up here to help us! The planes are coming!

You say the wildlife agencies checked our spray block and found a location where someone found a candidate butterfly species 13 years ago? And seven eagle nests too? Now what. We have a good idea, skip the area with the liquids and go back with a ground bait rig and treat the perimeter. We have to stay out of the trees where the butterflies may live. Thank goodness the Grasshopper IPM Project trained us how to use this option.

Uff da --- Region says we have to have a separate work plan and rancher agreement to do this. That doubles our paperwork and we need to make all those contacts again! I hope we have enough orange flagging to mark the area. Let's see that grasshopper sample --- 3rd and 4th instar *Ageneotettix*, *Aulocara*, and *sanguinipes*. Great! They should take the bait so this might work. The ranchers will let me know if it doesn't; that's for sure.

Well everyone, we need to put up the boundary flags. Hey, make sure they are big enough to see from the air! I hope the wind doesn't tear them down again. Somebody, set up the mortality assessment sites.

Oh my gosh, I almost forgot. We need a monitoring team. Well, I'd better call the Region and tell them we need them about 3 days before the program starts.

Good news! The ground crew and wildlife people said the eaglets in all seven nests have fledged, and there's no need to have buffer zones like last year. Got lucky this time.

Hey --- things are starting to fall in place! Oh, no! Here comes the planes. The insecticide is coming tomorrow! Do I have the storage tank for the chemical? Is it properly bermed? I'd better sign for the chemical and send the waybill to the Region.

You're kidding! The airport manager said we have to move our chemical tank and berm? How come? The spot they said to put the first one is too close to the runway? I sure wish they would make up their minds. I hope that we can have the new one dug and ready by tomorrow before the tanker truck gets here with the insecticide. Man --- more grey hairs and chewed fingernails.

Well, all the planes have arrived. I guess we'd better check them and make sure they are in compliance with the contract. Boy, am I glad we have a government pilot to help with this. The planes checked in fine except for some things that I would never have known about. I never

heard of a prop log, let alone ask to see one. Our Government pilots really know what they are doing! I'm really glad we have the Aircraft Acceptance Form to go by.

Well, I guess we better fly in the observation plane and check the area with the contractor's chief pilot. Have all the bee hives been moved? How does the flagging look? Loran C signal strong? Maybe it would be a good idea to let the ground people take a flight so they can see what we are up against. Do all of the pilots have a map of the treatment area? Do all ground people have a map and know the operational plan? Time to get everyone together for a briefing. Man --- this is rugged country. Thank goodness electronic guidance finally works here. We just got Loran last year and now they are talking about the Global Positioning System (GPS). I'm relieved that we called for these turbine powered airplanes.

Whoops --- good thing we went flying --- spotted some bees still left in the block by that old farmstead. They are at an unregistered location, but I'll talk to the landowner tonight and see if he knows who owns them. Hopefully they can be moved so the project isn't delayed.

Everything looks great! We are ready to start tomorrow morning. What time do we get up? 3:00 a.m. --- Oh my gosh. Remember we're using Sevin 4®-Oil and the recirculation pumps need to be running. We are lucky the company has sent their representatives to do this.

Ground crew --- do you have your wind meters and dye cards? Radios working and charged batteries in the portables? Don't forget to monitor the ground and air temperature and put out the cards. If there are any sensitive areas, place cards around them. We don't want to spray anything where we may harm the environment! I sure wish the Little Missouri River didn't meander through the block. Let's make sure the contractor understands he must not treat within 500 feet of water.

Well, I guess I'd better go up in the observation plane and check the conditions. The only condition I'm sure of is that Dramamine® sure makes me jittery. I hope the observation plane's engine doesn't stall in mid air like last year. Have I forgotten anything? Hey ground crew ---how are things down there! Conditions good --- let's get the planes in the air, we won't have long to work after the sun gets up too high. Timekeeper --- are all the planes loaded and are the amounts recorded on the Daily Aircraft Record? Don't forget to sign it and have their representative sign it.

Let's see --- have I updated my diary on all the events pertinent to this contract?

We're spraying! No plugged nozzles --- great!

The winds are coming up and the insecticide is starting to rise. We'd better call it a day. Don't forget to pick up the spray cards. Did any drift get in the sensitive areas? --- No?

--- Great! Butterflies, eagles, fish --- sure glad the monitoring team is here. I hope they don't run out of dry ice.

I'd better complete the master map for the area we completed. Don't forget the daily and base logs. Oh Ya --- I've got to call the office ASAP with an update on acreage treated and amounts of pesticide used. Our secretary sure gets irritated when we don't do that. Well, I'd better meet with contractor's representative and see how they handled everything. I must remember to thank them for keeping the nozzles clean.

3:00 a.m. again! Don't forget to start the mortality assessment today. Were there any skips? There were? Well, record them on the map so we can treat them later. Two loads today --- not bad.

3:00 a.m. again! We better wait to see what this storm front is going to do. Stand by ground crew. I hope you don't mind sitting by your radio all day. Hey Jim --- I think there is an old bag of sunflower seeds under the seat in case you get hungry. Oh well --- it's 4:00 p.m. and the front is still stalled. We'll try it again tomorrow.

3:00 a.m. again! Everyone is getting tired. I hope nobody has an accident. How much rain last night? 0.82 inches in the spray block and hail too. Boy, I hope the carbaryl didn't wash off. This weather is crazy. Spraying grasshopper one day and throwing snowballs the next. I hope someone in town has a pump to rent so we can drain the berm. At least we know it doesn't leak!

Another day, another 3:00 a.m. Maybe we can get these last two loads out. It looks like a good day. Hopefully, this heavy dew won't delay us too long or the wind will shut us down. Why can't it ever be easy?

Observation plane to Jeff --- did we stay far enough away from Nelson Foster's research plots? Yes? Great! Show the cards to Nelson as soon as we finish. He's pretty nervous. One puff of drift would ruin his whole summer's work.

Observation plane to Terry --- The planes spooked about 50 head of cattle through a fence and they're heading down the road. Can you go and help the rancher herd them back? The other ground observers can cover for you on the weather readings. Wow, that's the first time I ever saw cows jump like deer. That poor rancher sure has a lot of fencing to do. I guess cows don't like 4 turbines flying 75 feet overhead at 130 miles per hour.

The spraying is finished --- and the ranchers are happy! All of the skips have been treated. I'd better release the contractor. Great --- he has his gear cleaned up. Got to get the storage tank and berm cleaned up and talk to the airport manager again. Continue with the mortality checks. Ground crew --- please pick up all the used flagging and take them to the dump. Our ground crew sure did a nice job.

The ranchers want to know what they owe us. I'd better complete the financial statement and bill them. I also have to get the paperwork to FSO so we don't get assessed penalties. The 817's, the 802's, the 329's, the 132's, the 94's ---I better get them to the right places. Where does it end. I better get the written reports to the Federal land managers on how the treatment went --- and a map. Don't forget to bill the State.

Well another successful grasshopper treatment. You know --- there's a lot of work and coordination, but it all has to be done. Better get ready to do the next one.



Appendix G

Aerial and Ground Bait Equipment and Information

Introduction

This appendix is reserved for a reprint of information contained in the Grasshopper Integrated Pest Management User Handbook, which describes application equipment, calibration techniques, management issues, and options.



Appendix H

Manual Maintenance

Contents

Introduction	page-H-1-1
Issuing Revisions	page-H-1-1
Keeping Manuals Current	page-H-1-1
Knowing What's Revised	page-H-1-2
Knowing Your Responsibility	page-H-1-2
Ordering Manuals	page-H-1-2
Adding and Changing Addresses and Copy Counts	page-H-1-3
Correcting Errors and Suggesting Improvements	page-H-1-3

Introduction

This appendix is a description of how APHIS-PPQ will support this manual. Here also are directions for you to follow in maintaining the integrity of the Aerial Application Manual.

Issuing Revisions

APHIS-PPQ will revise the Aerial Application Manual by distributing immediate updates. We will schedule new editions at fixed intervals—at least every 5 years. If more than 50 percent of some section changes, we will issue a new section. We will **not** issue an update solely to correct a minor typographical error. Errors will be corrected only when they would lead to an incorrect action.

Keeping Manuals Current

There are three ways to track revisions to this manual—the Update Record, transmittal memos, and control data.

The *Update Record* is on the back of the title page. use it to record all the transmittals you receive. If you miss a transmittal, the *Update Record* alerts you. APHIS-PPQ will mail all revisions with a transmittal memo. The memos are numbered consecutively—allowing you to know if you've missed a transmittal. Filing these memos to assure that you have received all the previous issuances is best. File transmittals immediately upon receipt.

Besides having numbered transmittals, each page in the manual has control data. This is positioned at the bottom of the page. The revised pages' control data alerts you to whether you have the most up-to-date version. The control data looks like this:

PPQ
03/2002-01

03/2002 is the month and year the page was issued. -01 is the Transmittal number (the first transmittal issued for the year always begins with `01').

Knowing What's Revised

The transmittal will explain the revision's purpose and give you directions for making the revision.

Except changes to the index, APHIS-PPQ marks all revisions with or change bars (|). If no other changes occur, material moved from the bottom of one page to the top of the next page will **not** be marked.

Knowing Your Responsibility

To enhance professionalism, keep your Aerial Application Manual current. Therefore, please do the following:

1. Read the revisions when you receive them.
2. Record your transmittal in the Update Record.
3. Add or replace the revised pages the day you receive them.
4. If a practice exercise is included, complete it.
5. File transmittal memos in your manual.
6. If you miss a transmittal, order another one.
7. Let the Manuals Unit know when APHIS-PPQ has made an error.
8. Give the Manuals Unit your suggestions for improvements.

Ordering Manuals

Management and Budget's Management Services Division, Printing, Distribution, and Mail Branch, is responsible for storing and distributing PPQ's manuals and their associated updates. Their address is as follows:

USDA, APHIS, MSD
Printing, Distribution, and Mail Section
4700 River Road
Suite 1A01
Riverdale, MD 20737
301-734-5523
FAX: 301-734-8455
email: mary.l.kellington@aphis.usda.gov

Use E-mail, FAX, telephone, or mail when requesting services and always provide the following:

Organization
P.O. Box or Street Address, include Room or Suite Number
City, State, and nine-digit Zip Code
Contact Person
Telephone Number
FAX Number

When ordering the Manual and related updates (Transmittals), provide the following additional information.

List the title: Aerial Application Manual
Indicate either the initial distribution or a transmittal number
List the number of copies you need

Adding and Changing Addresses and Copy Counts

When adding and changing addresses and copy counts for distribution, provide the following additional information.

List the title: Aerial Application Manual
List the number of copies you need to get
List the new, corrected, or deleted address

Correcting Errors and Suggesting Improvements

If you detect an error, call, send an E-mail message, or FAX John Patterson or anyone else in PPQ's Manuals Unit.

Index



A

- Accident contingency plan and emergency contacts for pesticide spill [3-6-8](#)
- Addresses
 - changing addresses and copy counts [H-1-3](#)
- Aerial
 - and ground bait equipment and information, Appendix G (reserved) [G-1-1](#)
 - application observer [2-9-8](#)
 - Contractor Performance Evaluation Report (PPQ Form 817) [4-11-5](#)
 - example of [4-4-4](#)
 - program description data sheet [2-8-1](#)
 - sample of [2-8-5](#)
- Aerial Contractor Performance Evaluation Report (PPQ Form 817)PPQ Form 817, example of [4-4-4](#)
- Aircraft
 - and equipment [4-4-3](#)
 - elements to inspect or monitor during control program [4-4-3](#)
 - and Pilot Qualification Acceptance Report (PPQ Form 816) [3-12-21](#)
 - categories
 - A aircraft [2-7-4](#), [2-7-6](#)
 - B aircraft [2-7-4](#), [2-7-6](#)
 - C aircraft [2-7-5](#), [2-7-6](#)
 - D aircraft [2-7-5](#), [3-12-16](#)
 - facilities
 - airports and airstrips [2-7-7](#)
 - minimum airstrip sizes [2-7-7](#)
 - guidance [3-11-1](#) to [3-11-4](#)
 - DGPS accuracy check procedures [3-11-2](#)
 - electronic [3-11-1](#)
 - Global Positioning System (GPS) [2-5-2](#), [3-11-2](#)
 - Loran C [3-11-1](#)
 - loads [3-13-2](#)
 - log (example) [3-12-7](#)
 - operations support [2-11-1](#)
 - registration, example of [3-12-2](#)
 - requesting a PPQ pilot [2-11-1](#)
- Aircraft Registration Certificate [3-12-2](#)
- Airport recorder (timekeeper) [2-9-3](#)
- Airports
 - and airstrips [2-7-1](#), [2-7-7](#), [4-2-2](#)
 - operations [4-4-2](#)
 - recorder (timekeeper), duties of [2-9-3](#)
- Airstrip supervisor [2-9-3](#)
- Antenna, base station [3-5-3](#)
- APHIS Form 329 [4-11-2](#), [4-11-6](#)
 - instructions for completing [4-11-3](#)
- Application
 - for commercial credit card (VISA), sample of [3-4-2](#)
- Assembling program information [2-2-1](#)

B

- Base
 - log [3-2-5](#) to [3-2-7](#)
 - station [3-5-3](#)
- Base station antenna [3-5-3](#)
- Batteries for portable radios [3-5-4](#)
- Beekeepers
 - notification of [2-3-2](#)
- Biological assessments and biological opinions [2-4-1](#)
- Boundary flagging [2-9-6](#) to [2-9-7](#)
- Bran bait [4-3-1](#)
- Briefings [3-7-1](#) to [3-7-5](#)
 - daily [4-6-1](#) to [4-6-2](#)

Buffer zones 3-8-3, 4-2-4

C

Calculate percent control for mortality assessment 2-15-2

Calibration
adjustments 3-10-4
formula 3-10-2
introduction 3-10-1

Calibration of aerial spray systems 3-10-1 to 3-10-7

Category A-D aircraft 2-7-2 to 2-7-5

Cellular phones 3-5-7

Certificate
medical 3-12-11
of aircraft registration 3-12-2
of Insurance 3-12-8
of Operating 3-12-4
of Special Airworthiness 3-12-9
pilot 3-12-9

Checklist
for pesticide spills 4-8-1
for program orientation 3-1-2

CHEMTREC 3-6-8

CHEMTREC Center 3-6-3

Cholinesterase testing 2-16-1, B-1-1 to B-1-6

Codes 3-5-5, 3-7-3
seven code 3-5-6
ten code 3-5-5

Commercial credit card 3-4-2

Communications distance and repeaters 3-5-2

Complaint form 4-10-3

Complaints 4-10-1 to 4-10-4

Complete liquid system, example of 3-12-23

Congested areas 3-8-3, 3-12-3, 3-12-5, 3-12-15

Contacts before spraying begins 3-9-1 to 3-9-2

Containers
pesticides 2-12-3

Contract Delivery Receipt (APHIS Form 329) 4-11-3

Contracting Officer's Representative (COR) 2-9-2 to 2-9-3

Contractor actions 4-4-1 to 4-4-4
monitoring 4-4-1

Contractor's Pesticide License 3-12-3

Control operations 4-2-1 to 4-2-18
crew and work assignments 4-2-8
daily startup 4-2-10
formation (team) flying 4-2-3
general briefing 4-2-4
height of ferry and application 4-2-3
pilot briefing 4-2-4
pilot experience 4-2-4
spray disposition 4-2-11
swath and swath checking 4-2-7 to 4-2-8
terrain type 4-2-5 to 4-2-7
visual observations 4-2-10
weather 4-2-8

Cooperative and interagency agreements 2-10-1

Cooperator billing statements and payments 4-11-5

Coordinator, environmental monitoring 2-9-11, 2-14-1

Correcting errors in the manual H-1-3

Criteria for selecting program maps 2-5-1

D

Daily briefing and map updates 4-6-1 to 4-6-4

Description data sheet
completing a 2-8-1 to 2-8-4
sample of 2-8-5

Detailed work plan 2-6-1 to 2-6-6
instructions for completing 2-6-2 to 2-6-4
sample of 2-6-5

Distress and emergency procedure 3-5-2

Distribution list
changing addresses or copy counts H-1-3

Documentation environmental [2-4-1](#)

Dry pesticide formulations [2-13-4](#)

Dyecard samplers [2-9-12](#)

E

Electronic guidance [3-11-1](#)

DGPS accuracy check procedures [3-11-2](#)

flight path recording [3-11-2](#)

Global Positioning System (GPS) [3-11-2](#)

Loran C [3-11-1](#)

Emergency and information services [3-6-3](#)

Endangered or sensitive species [3-8-3](#)

Endangered Species Act (ESA) [2-4-1](#)

Environmental

coordinator [2-14-1](#)

documentation [2-4-1](#)

monitoring coordinator [2-9-1](#), [2-9-11](#)

Environmental Assessments (EA) [2-4-1](#)

Equipment

for startup [3-4-1](#)

purchases on credit card [3-4-2](#)

Equipment and supplies, list of [2-9-11](#)

equipment descriptions [3-5-2](#)

Essential contract information

aerial program description data sheet [2-8-1](#)

directions for completing [2-8-1](#)

sample of [2-8-5](#)

F

Federal Communications Commission (FCC) [3-5-1](#)

Field Servicing Office (FSO) [3-4-2](#)

Final Environmental Impact Statement (FEIS) [2-4-1](#)

Finding of No Significant Impact (FONSI) [2-4-1](#)

Fixed-wing aircraft, working safety around [3-6-6](#)

Flagging material for project [2-9-6](#)

Flight

path recording [3-11-2](#)

review, example of [3-12-11](#)

Flow factor table for spraying solutions other than water [3-10-7](#)

Forms, for project [2-9-14](#)

Formulas for pesticide supply [4-7-1](#)

Formulations, dry pesticide [2-13-4](#)

FSO. See Field Servicing Office

G

General Operational Procedures Manual, M390 [3-6-2](#)

General precaution regarding safety [3-6-1](#)

Geographical Information Systems (GIS) [2-5-2](#)

Global Positioning System

DGPS accuracy check procedures [3-11-2](#)

flight path recording [3-11-2](#)

GPS. See Global Positioning System

Granulated pesticides [3-13-2](#)

Grits, bran, and rolled wheat, loading [3-13-2](#)

Ground

equipment, Appendix D (reserved) [D-1-1](#)

observer (scout), duties of [2-9-5](#)

Guidance flaggers [2-9-9](#)

Guidelines

for responding to news media [F-1-1](#) to [F-1-15](#)

for working safely around aircraft [3-6-7](#)

H

Hand held radios [3-5-3](#)

Handling pesticides [3-6-2](#)

memorandums and directives [3-6-3](#)

pesticide manufacturers [3-6-3](#)

PPQ manuals [3-6-2](#)

Standard Pesticide User's Guide [3-6-3](#)

State and local agencies [3-6-3](#)

Hazard

areas [2-5-4](#), [3-8-2](#)

information [3-6-9](#), [3-8-1](#)

Helicopter

working safely around [3-6-7](#)

I

Information
and guidance [2-4-2](#)
Program [4-9-1](#)
to record on master maps [2-5-2](#)

Instructions
completing a detailed work plan and
checklist [2-6-2](#)

Insurance Certificate [3-12-8](#)

Interdepartmental Radio Advisory Committee
(IRAC) [3-5-1](#)

Interval swath technique [2-12-4](#)
definitions of [2-12-4](#)
formulas for [2-12-4](#)

Introduction
to Airport Applications Manual [1-1-1](#)

IRAC. See Interdepartmental Radio Advisory
Committee

Items to be inspected [3-13-3](#)

J

Job aid
Determining amount of supplies to keep on
hand [3-4-1](#)

L

Labels
pesticide [3-6-2](#)

Legislative and Public Affairs (LPA) [4-9-1](#)
contact [4-9-1](#)

Liquid
pesticides [3-13-1](#)
system (complete), example of [3-12-23](#)

Loading facilities [3-13-1](#)
of granulated pesticide [3-13-2](#)
of grits, bran, and rolled wheat [3-13-2](#)
of liquid pesticide [3-13-1](#)

Local agencies [3-6-3](#)

Loran C [3-11-1](#)

LPA. See Legislative and Public Affairs

M

M390.1402, PPQ Guidelines for Managing and
Monitoring Pesticide Spills [3-6-2](#)

M390.1403, Collecting Environmental Monitoring
Samples [3-6-2](#)

Mailing list
changing addresses or copy counts [H-1-3](#)

Maintenance
of the manual [H-1-1](#) to [H-1-3](#)
record, example of [3-12-6](#)

Management for pesticide spill [4-8-1](#)

Mandatory requirements of personnel [2-9-2](#)

Manual
maintaining the [H-1-1](#) to [H-1-3](#)
ordering copies of [H-1-2](#)

Maps
criteria for selecting [2-5-1](#)
for project [2-9-12](#)
GIS [2-5-2](#)
information to record [3-3-1](#)
legend [2-5-5](#)
master program [4-6-3](#) to [4-6-4](#)
minute series [2-5-2](#)
program [3-3-1](#) to [3-3-2](#)
scales [2-5-1](#)
source of [3-3-1](#)
types of [2-5-1](#)

Marshfield Clinic [2-16-1](#)

Master program maps
information to record on [2-5-2](#)
maintaining [4-6-3](#)

Material Safety Data Sheet (MSDS) [2-4-2](#), [3-6-2](#)

McDonald, Stuart [4-9-1](#)

Medical certificate [3-12-11](#)

Meetings [2-3-1](#), [4-2-8](#)
briefing [4-6-1](#)
preprogram [2-3-1](#)
public involvement [2-3-1](#)
recording in log [3-2-3](#)
who should attend [2-3-1](#)

Memorandums
and directives 3-6-3
of Understanding 2-10-1

Messages 3-5-5

Minimum airstrip sizes 2-7-7

Minutes series maps 2-5-2

Miscellaneous supplies 2-9-12

Mobile radios and antennas 3-5-3

Monitoring contractor actions 4-4-1

Mortality assessment 2-15-1 to 2-15-3

N

National Environmental Policy Act (NEPA) 2-3-1,
2-4-1

National Pesticide Telecommunications Network
(NPTN) 3-6-3

Notification of beekeepers 2-3-2

Nozzles 3-10-2

NPTN. See National Pesticide Telecommunications
Network

O

Observation aircraft 2-7-6

Operating Certificate, example of 3-12-4

Operational plan, daily 4-1-2

Ordering manuals H-1-2

P

Personal protection 3-6-4

Personnel 2-9-1
elements to inspect or monitor during control
program 4-4-2
mandatory requirements of 2-9-2

Pesticide
applicator to monitor 4-4-2
labels 3-6-2
manufacturers, where to find phone
numbers 3-6-3
procuring 2-12-1
supply formulas 4-7-1

Pesticide spills
emergency contacts 3-6-8
kit contents 4-8-2

Pesticide supply formulas 4-7-1

Pesticides 2-12-1 to 2-12-5
applicator 4-4-2
burning tanks
job aid for 2-13-3
bulk storage containers 2-13-2
for project 2-9-12
formulas 2-12-3
formulations for dry 2-13-4
management 4-8-1
spills 2-13-4, 4-8-1 to 4-8-3
storage 2-13-1 to 2-13-4
area location 2-13-3
supply 4-7-1
formula 4-7-1

Pilot
certificate 3-12-9
letter of competency 3-12-14

Pilot/Aircraft inspection 3-12-1 to 3-12-23
Aircraft and Pilot Qualification Acceptance Report
(PPQ Form 816) 3-12-21

Portable radios (hand held) 3-5-3

PPQ Form
136
sample of 2-6-6
329
example of 4-11-6
802 4-5-1 to 4-5-5
distribution of 4-11-2
816
example of 3-12-2

PPQ Form 802
distribution of 4-5-2, 4-11-2
example of 4-5-5

PPQ manuals
for covering pesticide spills 3-6-2
for pesticide spills 4-8-3

PPQ pilot
duties of 2-9-7
requesting 2-11-1

Procedures for

- Cholinesterase testing 2-16-1
- program shutdown 4-11-1 to 4-11-6
- responding to complaints 4-10-4

Program maps 2-5-1, 3-3-1 to 3-3-2

Program maps, criteria for selecting 2-5-1

Program planning

- aircraft operations support 2-11-1
- aircraft selection 2-7-1
- cholinesterase testing 2-16-1
- detailed work plan 2-6-1 to 2-6-6
- environmental documentation 2-4-1
- environmental monitoring 2-14-1
- essential contract information 2-8-1
- information and problems 2-3-1
- memorandums of understanding and cooperative agreements 2-10-1
- mortality assessment 2-15-1
- personnel, materials, and equipment 2-9-1
- pesticide storage 2-13-1
- pesticides 2-12-1
- program maps 2-5-1
- size and scope 2-2-1

Program shutdown 4-11-1 to 4-11-6

Program startup 3-1-1 to 3-13-3

- briefings 3-7-1
- calibration of aerial spray systems 3-10-1
- daily and base log 3-2-1
- equipment and supplies 3-4-1
- orientation 3-1-1
- pilot/aircraft inspection 3-12-1
- program maps 3-3-1
- radio communications 3-5-1
- safety 3-6-1
- support agencies/groups 3-9-1
- treatment area 3-8-1
- worksite organization and inspection 3-13-1

Program story E-1-1

Program supervision

- bran bait 4-3-1
- complaints 4-10-1
- contractor actions 4-4-1
- control operations 4-2-1
- daily aircraft record 4-5-1
- daily briefing and map updates 4-6-1
- operational plan 4-1-1
- pesticide spills 4-8-1
- pesticide supply 4-7-1

Project scope 2-2-1

Purpose of manual 1-1-1

R

Radios

- batteries for 3-5-4
- communications distance and repeaters 3-5-2
- determining needs for 3-5-3
- equipment, descriptions of 3-5-2
- for project 2-9-11
- mobile and antennas 3-5-3
- operation of 3-5-4
- portable (hand held) 3-5-3

Record of Decision (ROD) 2-4-1

Record of incident/complaint, example of 4-10-3

Recording, flight path 3-11-2

Related documents to AAM 1-1-2

Requests

- for aircraft 2-7-6
- for PPQ pilot 2-9-7

Responding to complaints

- procedures for 4-10-4

S

Safety 3-6-1 to 3-6-10

- equipment 2-9-13

Scope of manual [1-1-1](#)

Scout, duties of [2-9-5](#)

Sensitive areas [2-5-3](#), [4-2-4](#)

Seven code [3-5-6](#)

Size and scope [2-2-1](#)

Sources of information for personal protection [3-6-4](#)

Special Airworthiness Certificate [3-12-9](#)

Spill kit [4-8-2](#)

Spray block [4-2-4](#)

Standard Pesticide User's Guide [3-6-3](#)

State agencies [3-6-3](#)

Storage
 area location [2-13-3](#)
 containers for pesticides [2-13-2](#)

Suggested improvements [H-1-3](#)

Support agencies/groups [3-9-1](#)

Swath technique [2-12-4](#)

T

Temporary airman certificate [3-12-10](#)

Ten code [3-5-5](#)

Timekeeper [2-9-3](#)

Treatment
 boundaries [2-5-3](#)

Treatment area [3-8-1](#) to [3-8-4](#)

Two-Way Radio Communication Operation Manual [3-5-1](#)

U

Update program [4-2-17](#)

Update record
 for the APM [1-1-ii](#)

Updating
 manual [H-1-1](#)
 program maps [2-5-6](#)

Users of manual [1-1-2](#)

V

Vehicle safety [3-6-5](#)

Vehicles for project [2-9-11](#)

W

Weather instruments [2-9-11](#)

Work Achievement Report (PPQ Form 136) [4-11-4](#)

Work checklist, sample of [2-6-6](#)

Worksheet for Determining the Number of Aircraft Needed for a Program [A-12-1](#)

Worksite organization and inspection [3-13-1](#) to [3-13-3](#)

Worksite shutdown [4-11-1](#)

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
Z